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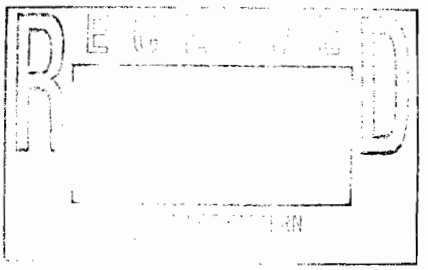
October 15, 2002

Mr. Joseph Jones
Bureau of Eastern Remedial Action
Division of Environmental Remediation
New York State Department of
Environmental Conservation
625 Broadway
Albany, NY 12233



Re: Site Numbers 1-30-009 and 1-30-053A
Second/Third Quarter 2002 Progress Report

File: 643.001

Dear Mr. Jones:

Enclosed please find three copies of the Second/Third Quarter 2002 Progress Report for the subject sites.

Should you have any questions regarding the enclosed, please feel free to contact Charlie Nehrig at 516-609-1052. Thank you.

Very truly yours,

BARTON & LOGUIDICE, P. C.

Andrew J. Barber
Senior Managing Environmental Scientist

AJB/mfg

cc: G. Anders Carlson, Ph.D., NYSDOH, Albany, NY (2 copies)
Robert Becherer, NYSDEC, Region 1, Stony Brook, NY (1 copy)
John F. Byrne, Esq., NYSDEC-DEE, Tarrytown, NY (1 copy)
James Harrington, NYSDEC, Albany, NY (1 copy)
Charlie Nehrig, Photocircuits (1 copy)
Louis Stans, Photocircuits (1 copy)
Mark Pennington, Esq., Morgan, Lewis & Bockius (1 copy)

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SECOND AND THIRD QUARTER 2002
PROGRESS REPORT

PHOTOCIRCUITS AND FORMER PASS & SEYMOUR SITES
31 & 45 SEA CLIFF AVENUE

SITE NUMBERS 1-30-009 AND 1-30-053A

Prepared for:
Photocircuits Corporation
31 Sea Cliff Avenue
Glen Cove, New York 11542

Prepared by:
Barton and Loguidice, P.C.
2 Corporate Plaza
264 Washington Avenue Extension
Albany, New York 12203

October, 2002

1.0 Introduction

This Second and Third Quarter 2002 Progress Report (2Q3Q02) is being submitted pursuant to the 1997 Order on Consent between Photocircuits Corporation and the New York State Department of Environmental Conservation (NYSDEC).

During the Second and Third Quarters of 2002, the following was accomplished:

- Two groundwater sampling events were conducted for monitoring wells located on both the 31 and 45A Sea Cliff Avenue sites during the periods of April 2-4 and June 25-26.

- A third injection of edible oil substrate was performed at the 31 Sea Cliff Avenue site on April 29.

- The Soil Vapor Extraction (SVE) and Air Sparging (AS) system at the 45A Sea Cliff Avenue site was moved from the west side of Building 7 to the east side; the SVE portion of the system was started on May 8

2.0 Discussion of Results

2.1 SVE System at 31 Sea Cliff Avenue

The SVE system at the 31 Sea Cliff Avenue site was installed as an Interim Remedial Measure (IRM), and started operation in April 2000. The SVE system, equipped with the CatOx/scrubber for extracted vapor treatment, was restarted on July 21, 2000 and was operated continuously until August 2001; system operation was interrupted only for a few brief periods for maintenance activities and in March to mid-May, 2001 because of high water-table conditions.

As discussed in the 2Q01 report, the results of vapor sample analyses and the photoionization detector (PID) readings demonstrate that contaminant mass removal versus time has clearly become asymptotic. We conclude that we have demonstrated that there is little or no residual contamination in the unsaturated zone, and that further contaminant removal from the unsaturated zone is infeasible. The SVE system will be decommissioned in the near future.

2.2 Bioremediation Pilot Test

The bioremediation pilot test was started during the week of August 28, 2000 when Terra Systems conducted the injection of a nutrient solution (substrate) into the subsurface at

the 31 Sea Cliff Avenue site. Following the injection, groundwater samples were collected from the following monitoring wells/points: MW-7, MW-14, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4 and DMP-4. These wells/points were sampled again on October 18-19, December 20, 2000, March 27-28, 2001and July 11-12, 2001; the March and July sampling events included several wells located along Sea Cliff Avenue (MW-8, MW-9, MW-12 and MW-13) along with the wells sampled during the previous events. Further sampling events conducted in 2002 were January 8-10, April 2-4, and June 25-26; the results from the April and June sampling events are provided in Appendix A of this report (Note: wells MW-7 and MW-14 were not sampled during these events as they were filled with oil substrate).

A status report on the pilot test (including the data from the samples collected in April 2002) was prepared by Terra Systems and is included as Appendix B of this report. The main conclusion of the report are as follows

- The addition of the edible oil substrate has enhanced the extent and rate of chlorinated solvent biodegradation at the site; degradation rates as high as 329 ug/L per day of total volatile organic compounds (TVOCs) have been observed in areas of higher concentration.

- A first order degradation half life of 495 days was calculated for the average total VOC concentration within the pilot cell area (January and April 2002 data); this degradation rate suggests that 90% of the total VOC mass within the pilot test cell will be removed within 46 months.

- The newly injected edible oil substrate appears to be adequately distributed.

- Bioremediation will be the primary treatment technology for contaminant destruction at the site.

By letter dated October 25, 2001, NYSDEC authorized an additional injection of substrate that had been recommended by Photocircuits. A first phase of additional substrate injection was conducted during the period of February 25 to March 3, 2002; during this period, slightly over 5,000 gallons of substrate was injected (as reported in the 1Q 02 report). On April 29, 2002, an additional injection of 5,777 gallons of substrate was injected using the injection points that had been installed during the February-March injection event. Details on the volumes that were injected in each point are provided in the status report prepared by Terra Systems (included as Appendix B of this report).

A status report on the pilot test (including the data from the samples collected in June 2002) was prepared by Terra Systems and is included as Appendix B of this report. The main conclusion of the report are as follows

- The addition of the edible oil substrate has enhanced the extent and rate of chlorinated solvent biodegradation at the site; degradation rates as high as 301

ug/L per day of total volatile organic compounds (TVOCs) have been observed in areas of higher concentration.

- A first order degradation half life of 578 days was calculated for the average total VOC concentration within the pilot cell area (January, April and June 2002 data); this degradation rate suggests that 90% of the total VOC mass within the pilot test cell will be removed within 52 months.

- The newly injected edible oil substrate appears to be adequately distributed.

- Bioremediation will be the primary treatment technology for contaminant destruction at the site.

2.3 IRM at 45 Sea Cliff Avenue

As discussed in the 4Q 2000 report, SVE/AS equipment was procured and delivered to the site. The SVE/AS system consists of a 10 horsepower (hp) regenerative blower and 5 hp compressor, along with electrical controls, filters, moisture separators, and valves; the system is contained within an insulated trailer, which has been located just outside of Building 7. Following delivery, the system components were connected to the piping networks for the AS and SVE wells. Two 1200 lb activated carbon adsorbers were attached in series to the blower outlet to treat recovered vapors. The SVE system was started on November 1, 2000; because the initial contaminant concentrations were relatively high, the AS portion of the system was not started. The AS component of this system was started on March 28, 2001. The system was down from April 20-24 due to an electrical problem. The system was down most of June and July due to equipment overheating; the system was re-started on July 30 and shut down on September 20.

Monitoring data was presented in the 2Q01 report, including data from sampling of individual SVE wells (March 2001) and sampling of total SVE system effluent over time. Prior to the start of the AS component, the relationship of total contaminant mass removal versus time was clearly becoming asymptotic. The start of the AS component increased contaminant mass recovery somewhat (see the April 2001 sample results). However, the results of the May vapor sample indicate that mass removal versus time relationship became asymptotic. We concluded at that time that we demonstrated that there is little or no residual contamination at that location, and that further contaminant removal is infeasible.

Monitoring wells located on the 45A Sea Cliff Avenue site (MW-1S, MW-2S, MW-3S and MW-4S) and near the 45A Sea Cliff Avenue site (MW-9, MW-10 and MW-11) were sampled in January 2002, and the results are attached. Based on results from the January sampling event, Photocircuits proposed extending the SVE/AS system at the 45A Sea Cliff Avenue site from the west side to the east side of Building 7. The basis for the extension of the system and the proposed piping and equipment layout were provided in the February 13 letter to NYSDEC.

The SVE wells and AS points were installed at the proposed locations on the east side of Building 7 in late February, in preparation for the extension of the system. After field evaluation, it was decided that it would be more efficient to move the aboveground portions of the system (equipment trailer, carbon vessels) to the east side of Building 7 rather than to extend their operation by piping from the west side to the east side of Building 7, as originally proposed. The trailer and carbon vessels were moved in April, and electrical service was also provided to the new location April. Piping and mechanical connections were completed in early May; the original blower malfunctioned and a smaller replacement blower was installed (a specification sheet for the new blower is attached to this report). The attached figure shows the equipment and piping layout for the system.

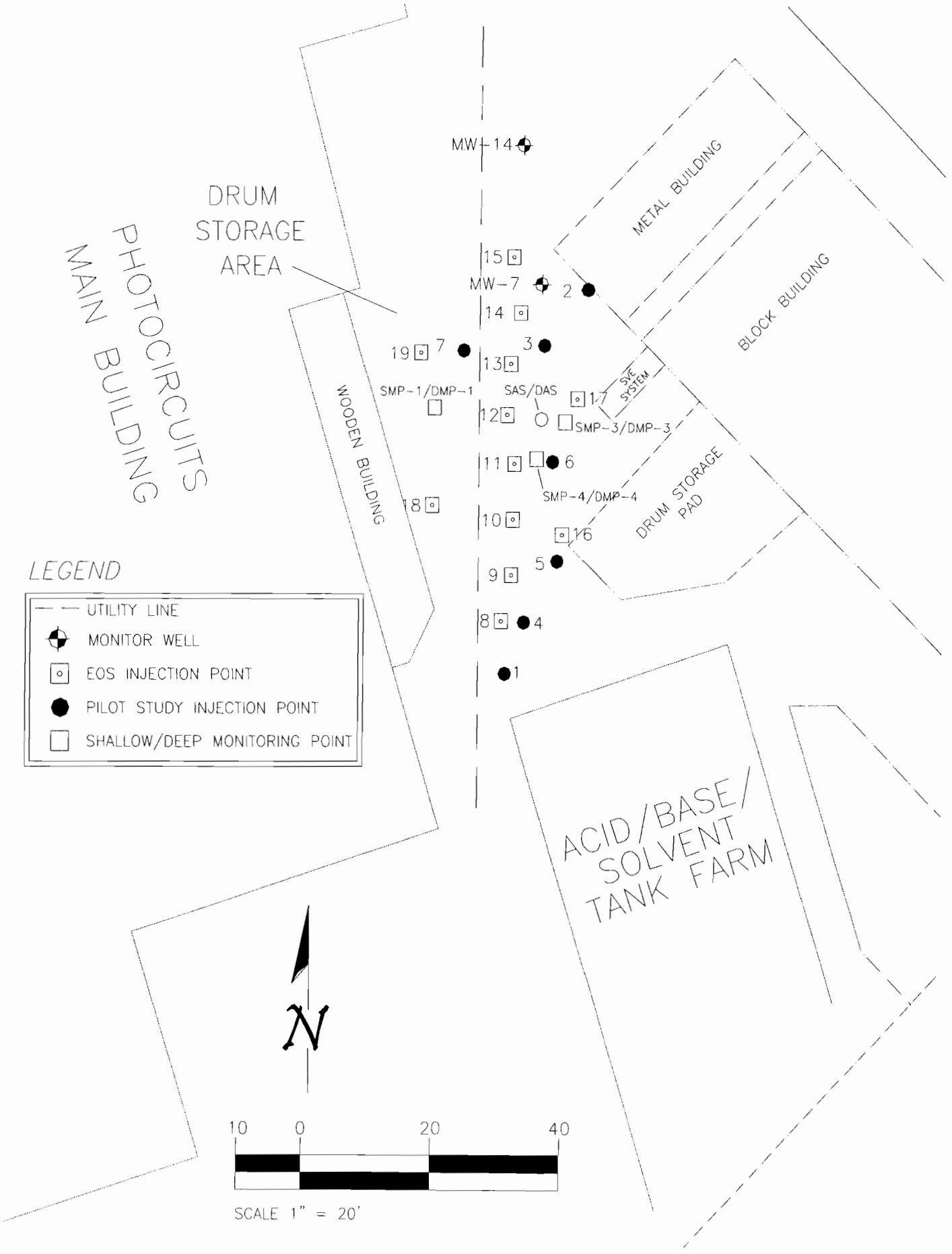
The SVE portion system was started on May 8, a sample of the total system effluent, prior to treatment, was collected; tetrachloroethene was detected at a concentration of 5.3 ppmv. Another effluent sample was collected on June 26; tetrachloroethene was detected at a concentration of 142 ppmv and trichloroethene was detected at a concentration of 2 ppmv. Analytical the results are provided in Appendix A of this report. The AS portion of the system will be started when monitoring data indicate that contaminant recovery by SVE alone has leveled off.

2.4 Hydraulic Control along Sea Cliff Avenue

A meeting was held with NYSDEC on October 11, 2001 to discuss the progress of the bioremediation pilot test. Although there was substantial disagreement between Photocircuits and the NYSDEC over the progress of the bioremediation pilot test and the need for groundwater remediation, Photocircuits agreed to review available options for containment of groundwater along the northern boundary of the Photocircuits site (31 Sea Cliff Avenue). Photocircuits conducted the review of remedial options, and by letter dated October 26, 2001, Photocircuits presented the results of the review. The recommended approach for the conditions at the Photocircuits site is the use of hydraulic control. Photocircuits submitted a work plan for the performance of pumping tests necessary for the design of a hydraulic control system on November 13, 2001; following receipt of verbal comments from NYSDEC, Photocircuits submitted a revised work plan on December 7, 2001. Approval for implementation of the work plan was received from NYSDEC by letter dated December 19, 2001. The pumping tests were performed in January and the remedial design report was submitted to NYSDEC on April 11, 2002.

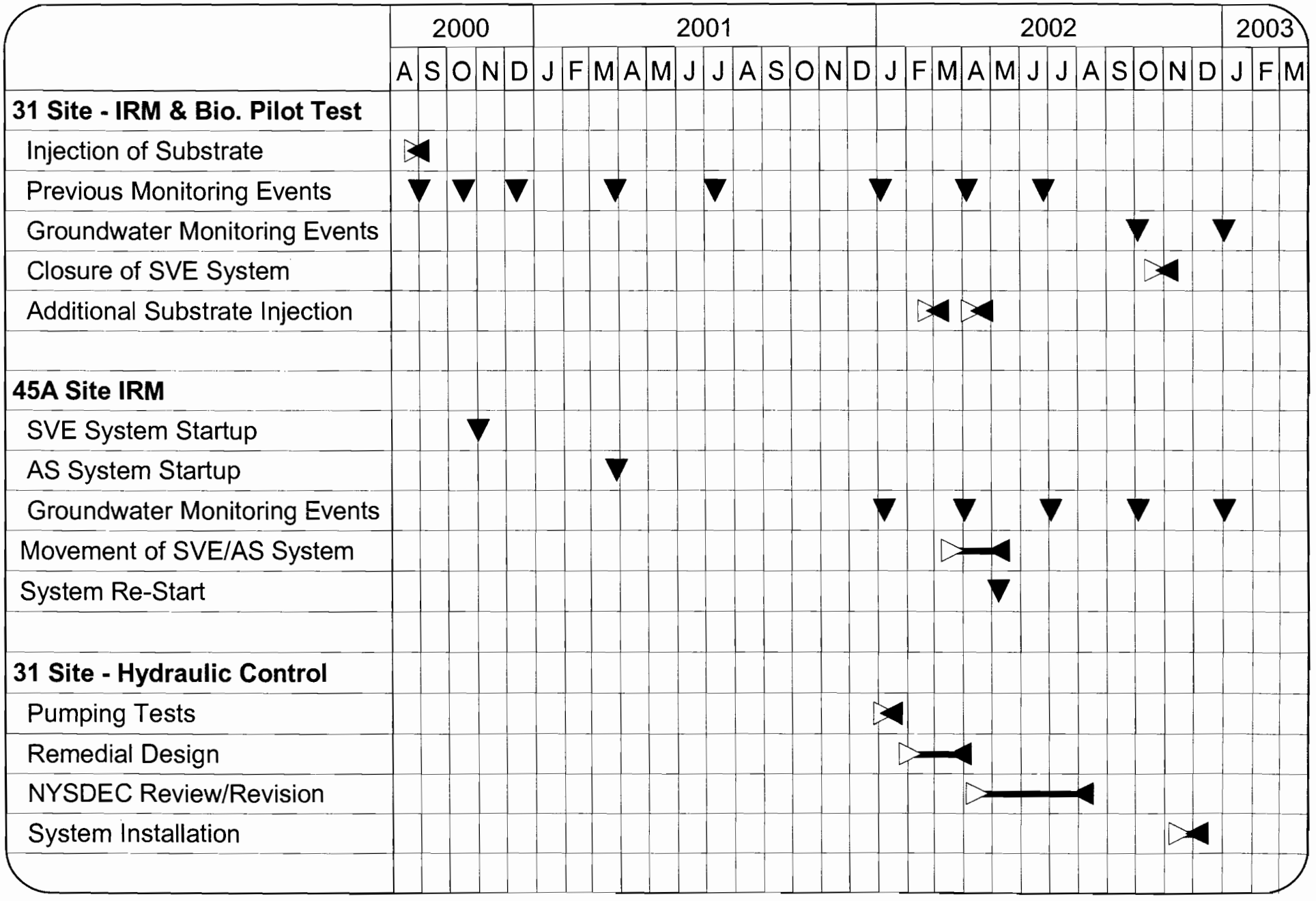
3.0 Schedule

The planned schedule of activities for the next few months is attached.


MW-14
DRUM STORAGE AREA
PHOTOCIRCUITS MAIN BUILDING
METAL BUILDING
BLOCK BUILDING
WOODEN BUILDING
DRUM STORAGE PAD
ACID/BASE/ SOLVENT TANK FARM
MW-7
SVE SYSTEM
SMP-1/DMP-1
SAS/DAS
SMP-3/DMP-3
SMP-4/DMP-4
15
14
19
7
13
12
17
11
18
10
16
9
8
2
3
6
5
4
1
LEGEND
UTILITY LINE
MONITOR WELL
EOS INJECTION POINT
PILOT STUDY INJECTION POINT
SHALLOW/DEEP MONITORING POINT
N
10 0 20 40
SCALE 1" = 20'

Photocircuits - Updated Schedule of Remedial Activities

31 & 45 Sea Cliff Avenue Sites



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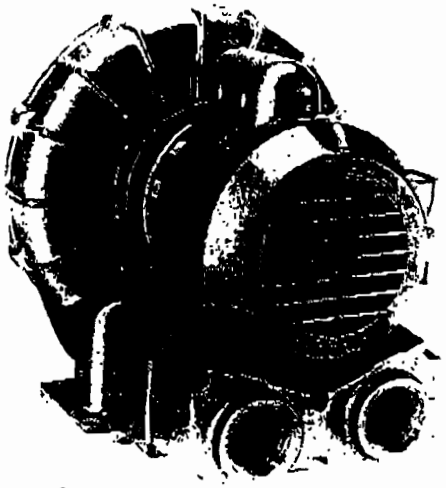

MODELS R4110-2/R4310A-2

52" H_2O MAX. PRESSURE, 92 CFM OPEN FLOW
48" H_2O MAX. VACUUM, 88 CFM OPEN FLOW

PRODUCT FEATURES

- Oilless operation
- TEFC motor mounted
- Can be mounted in any plane
- Rugged construction/low maintenance
- Can be operated with no air flow through unit
- Class B insulation on motors
- Automatic restart thermal protection on single phase motors

COMMON MOTOR OPTIONS

- 115/208-230V, 60 Hz, 110/220-240V, 50 Hz, single phase
- 208-230/460V, 60 Hz, 190-220/380-415V, 50 Hz, three phase
- 575V, 60 Hz, three phase

EXPLOSION PROOF

RECOMMENDED ACCESSORIES

- Pressure gauge AJ496
- Filter AJ126D (pressure)
- Vacuum gauge AJ497
- In-line filter AJ151D (vacuum)
- Muffler AJ121D
- Relief valve AG258
- Nema motor starter size – 0/00 (R4110-2), 00/00 (R4310A-2), for 60 Hz operation
- Moisture separator RMS160 (vacuum)

Various brand name motors are used on any model at the discretion of Gast Mfg. Corp.

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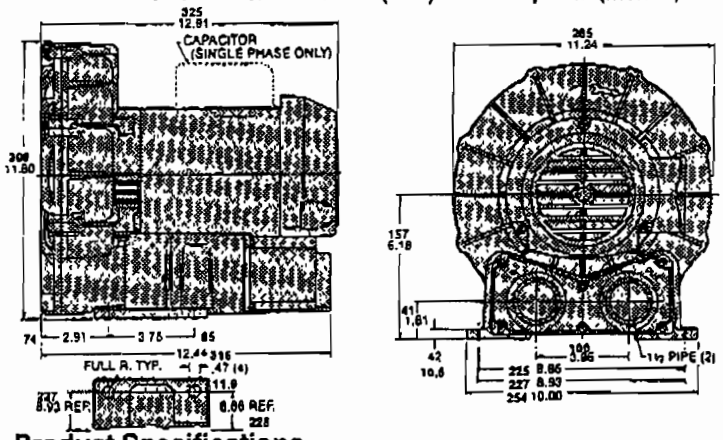
Product Dimensions Metric (mm) U.S. Imperial (inches)

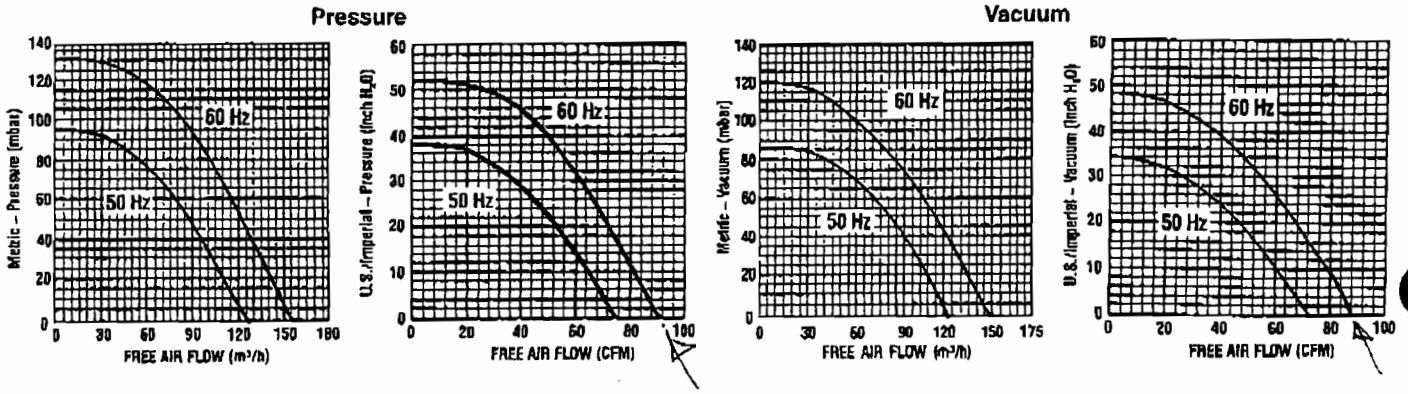


Product Specifications

Model Number	Motor Specs	Full Load Amps	Locked Rotor Amps	HP	RPM	Max Vac "H_2O	Max Vac mbar	Max Pressure "H_2O	Max Pressure mbar	Max Flow cfm	Max Flow m^3/h	Net Wt. lbs.	Net Wt. kg
R4110-2	110/220-240-50-1	9.0/4.5-5.7	31.2 @ 230V	0.6	2850	34	85	38	95	74	126	41	18,6
	115/208-230-60-1	9.8/5.2-4.9		1.0	3450	48	120	52	130	92	156		
R4310A-2	190-220/380-415-50-3	2.6-3.3/1.3-1.4	26.5 @ 230V	0.6	2850	34	85	38	95	74	126	41	18,6
	208-230/460-60-3	3.4-3.2/1.6		1.0	3450	48	120	52	130	92	156		

Product Performance (Metric U.S. Imperial)

R4110N-50 EXPLOSION PROOF SOIL VENTING MODEL



Terra Systems
INCORPORATED

JUNE 2002
STATUS REPORT
PHOTOCIRCUITS ACCELERATED ANAEROBIC BIOREMEDIATION PILOT

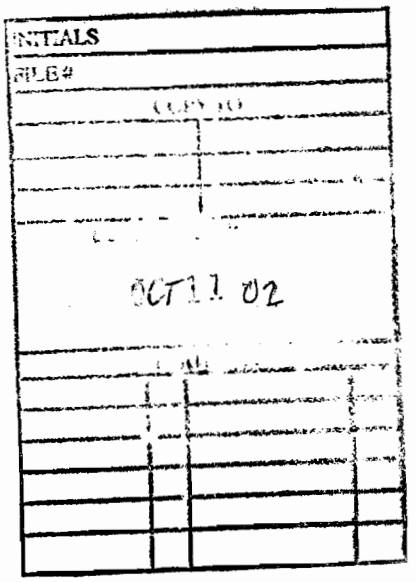
PREPARED FOR:

PHOTOCIRCUITS CORPORATION
31 SEA CLIFF AVENUE
GLEN COVE, NY 11542

PREPARED BY:

TERRA SYSTEMS, INC.
1035 PHILADELPHIA PIKE
SUITE E
WILMINGTON DE 19809

OCTOBER 7, 2002



1035 Philadelphia Pike, Suite E • Wilmington, Delaware 19809 • (302) 798-9553
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1.0 EXECUTIVE SUMMARY

In August 2000, Photocircuits Corporation initiated a pilot study at its 31 Sea Cliff Ave. property to treat chlorinated volatile organic compounds (VOC) using in situ anaerobic bioremediation. The site is characterized by VOC contamination of a sandy, silt, and gravel aquifer. Monitoring data indicate that some biodegradation of these contaminants was occurring at the site prior to the start of the pilot study. The two primary objectives of this pilot study are to 1) evaluate the use of substrate injection to enhance in situ anaerobic biological degradation of chlorinated VOCs in the study area and 2) obtain operating and performance data to optimize the design and operation of a full-scale system. During the operational period of this pilot study, there is no emphasis on reducing any contaminants to a specific regulatory level.

The study area, which encompasses a triangular area roughly 92 feet wide, 157 feet long, and 60 feet deep, underlies the former drum storage area of the Photocircuits Corporation facility. Prior to the start of the pilot test, total chlorinated contaminant concentrations in wells within the pilot area ranged from 457 to 539,000 µg/L. The initial pilot bioremediation system consisted of six injection points in a line spaced about 15 to 20 feet apart. An edible oil substrate (EOS) package was designed to provide a slow release food grade carbon source over a period in excess of twelve months. The substrate concentrations were selected based on previous experience. An additional 5,722 gallons of substrate was injected in months 17 and 19 at twelve injection points. VOC and substrate concentrations have been monitored seven times over a twenty-two month period at eight wells spaced throughout the treatment area. VOC and substrate concentrations have also been monitored at four wells downgradient of the treatment area to determine if the substrate has migrated outside of the area and if the substrate amendment has affected these wells.

The system has been operating since August 31, 2000. Substrate monitoring data indicated that substrate was delivered throughout the treatment area with the highest substrate levels found in well MW-14. In the initial injection event in August 2000, the emulsion moved into this well from several of the injection points and displaced much of the contaminated groundwater within this well. Wells MW-14 and MW-7 contained the emulsion in June 2002 and were not sampled. Contaminant levels have increased in MW-14 and MW-7 between August 2000 and January 2002 when the last samples were collected from these wells. An increase in total VOCs has also been observed in SMP-1. Desorption of contaminants adsorbed to the soil due to enhanced biological activity may be contributing to the increased contaminant concentrations in MW-14, MW-7, and SMP-1. Contaminants that partitioned into the injected oil may also be released. Where substrate levels were above 50 mg/L, significant declines in total VOC concentrations (45-96%) were generally observed. Degradation rates for the total VOCs (9/1/01 concentration minus 6/25/02 divided by 662 days) were as high as 301 µg/L-day (well SMP-3) in higher concentration areas with greater than 100,000 µg/L total volatiles. In other areas with lower concentrations, total VOC degradation rates were lower, in the range of 1.8 (DMP-4) to 26 µg/L-day (DMP-3). The average total contaminant concentrations within the pilot cell have fallen by 66% since September 2000. This average includes the wells sampled on 6/25/02 and the two wells last sampled on 1/8/02. The recent substrate reinjection increased the TOC concentrations in all wells within the pilot. In June 2002, TOC levels ranged from 24.3 mg/L in DMP-3 to 3,440

mg/L in SMP-4. About 2,200 gallons of emulsion was injected upgradient of the monitoring wells where it should provide a continuous source of organic carbon.

2.0 INTRODUCTION

The enclosed report describes the field pilot study of *in situ* anaerobic bioremediation of a chlorinated solvent plume at the Photocircuits Corporation's 31 Sea Cliff Avenue, Glen Cove, NY facility. The study, which was initiated on August 31, 2000, has the following objectives:

- Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.
- Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.
- Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.
- Determine what role bioremediation technology has in the overall remediation strategy for the site.

There have been seven groundwater sampling events during the course of the study. As of June 2002, the average total volatile contaminant concentrations within the pilot have decreased by 66%.

During the treatment period of 22 months, we have successfully demonstrated that the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at this site as indicated by the following observations:

- Total contaminant concentrations have decreased by an average 66%.
- The average concentrations of the parent compound 1,1,1-trichloroethane has decreased by 95%
- Three monitoring wells (MW-7, MW-14, and SMP-1) have shown increased total volatile concentrations since September 1, 2000 by 15 to 4,529%. Wells MW-7 and MW-14 could not be sampled in April 2002 and June 2002 due to the presence of emulsion and the percent change calculations are from September 2000 to January 2002. However, when viewed over the last 13 years, the total VOC concentrations in MW-7 have decreased 96%. From 11/1/99 to 1/8/02, total VOC concentrations have decreased by 44% in MW-14. Since 11/1/99, well SMP-1 has shown an increase in total VOC concentrations of 7,585%. TCE and cDCE concentrations increased sharply between 1/8/02 and 4/2/02 in SMP-1. However, between 4/2/02 and 6/25/02, TCE and cDCE concentrations declined in SMP-1 and VC and ethene concentrations increased.

It is difficult to determine the total contaminant mass present at this site because of the limited number of soil samples and limited definition of the vertical distribution of this contamination. The total contaminant mass was estimated to be approximately 1,195 pounds based upon the average soil concentrations found in the 1996 or earlier soil borings and a contaminated volume of 361,100 ft^3 (a triangular area 92 feet by 157 feet with a contaminated interval below the water table from 10 to 60 feet below ground surface).

Please note that the goal of this study has been to gather sufficient data to determine the rate and extent of chlorinated solvent biodegradation. If the study area could be isolated such that the

contaminant mass did not receive any additional contaminants, Terra Systems, Inc. estimates that based upon the current degradation rates that approximately 90% of the total contaminant mass can be removed in 52 months. Although an acceptable remediation end point has not been defined for this site, the data suggests that this reduction will be environmentally acceptable since it significantly reduces the probability that chlorinated solvents will migrate off-site.

3.0 BACKGROUND

The Photocircuits Corporation's 31 Sea Cliff Avenue facility, Glen Cove, New York is located on the north shore of Long Island. The plant site is bordered on the north by a light industrial area, to the south and east are arterial roads, and to the west by railroad tracks. The site is generally flat and is covered by manufacturing buildings and parking lots.

3.1 Site Geology/Hydrology

Based on analysis of soil borings and details of well construction at the Photocircuits site, the surficial deposit below the facility is primarily composed of interbedded sand, silt, gravel, and clay layers.

3.2 Nature and Extent of Contamination

The groundwater at the facility has been impacted by chlorinated ethene and chlorinated ethane compounds from various sources. Prior to the start of the pilot test, total volatile organic contaminant concentrations (TVOC) in groundwater ranged from 457 to 539,000 µg/L. Generally, the contamination extends to approximately 90 below ground surface (bgs) with the highest concentrations in the 20 to 50 ft. bgs zone.

3.3 Rationale for Use of Technology

Photocircuits Corporation has been conducting a technology review to determine which remediation technology or technology treatment train will be most appropriate for this facility. Conventional pump-and-treat technologies have been excluded from this review since these technologies have limited applications for aquifer and groundwater restoration (Beeman et al 1993). Other technologies considered have been discussed in other reports submitted to the NYDEC.

Many of the currently utilized cleanup methods for chlorinated solvents employ physical processes that tend to transfer the compounds to another medium. Biological decomposition is one approach that has the potential for destroying hazardous chemicals so that they are rendered harmless for all time.

Semprini et al (1992) outlined the processes affecting movement and fate of halogenated aliphatics as:

1. Advection, the miscible transport in aqueous solution under the influence of the hydraulic potential gradient;
2. Dispersion, the mixing and spreading of concentration fronts, that arises largely from differential rates of movement along the myriad individual flow paths through the porous medium;
3. Sorption, the partitioning of a compound between the moving solution and the stationary solid phase;

4. Immiscible transport, the migration of slightly soluble chemicals as a separate liquid phase, often driven downward by density difference in the case of halogenated aliphatics; and
5. Diffusional transport, the slow migration of solute molecules into the matrix rock or dead-end pores under the influence of a concentration driving force.

Given the heterogeneity of the site and the lack of definitive knowledge of the amount of chlorinated solvents in the impacted area, a technology that can remove a significant amount of the solvents and continue to treat the remaining material is required. While physical technologies such as "pump-and-treat" systems can generally contain a contaminant plume and remove a limited amount of material, it has not been conclusively demonstrated that these technologies can remove a significant amount of the solvents. The USEPA (1996) has stated that

> "The general failure of the pump-and-treat approach was identified as its inability to achieve restoration (i.e., reduction of contaminants to levels required by health-based standards) in 5 to 10 years, as anticipated in the design phase of projects. Although a variety of factors contributed to this shortcoming, tailing and rebound (Section 4) represented the major barrier to achieving remediation goals."

Chemical technologies such as chemical oxidation have promise for removal of a significant portion of the contamination but have not been demonstrated to provide treatment for all of the solvents. For example, 1,1,1-Trichloroethane is resistant to potassium permanganate treatment (ITRC 2000). The chemical oxidants react rapidly with the contaminants and reduced minerals in the soil and do not provide a continuing impact on the contaminants.

As part of the technology review program, Photocircuits Corporation engaged Terra Systems, Inc. (TSI) to conduct an anaerobic bioremediation field pilot study at the facility. The study, which encompasses a triangular area roughly 92 feet wide and 157 long that had been used for drum storage, commenced in August-September, 2000. Eight monitoring points (MW-14, MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, and DMP-4) are being utilized to track the progress of the pilot study. Beginning in March 2001, groundwater samples were also collected from 4 additional wells (MW-8, MW-9, MW-12, and MW-13) to determine if any of the injected substrate had migrated away from the study area. It should be noted that these wells are not expected to be impacted by the bioremediation study. The locations of these wells are shown in Figure 1 with the exception of MW-9 that is further to the west.

Historical data indicates that anaerobic biodegradation is occurring at the site as evidenced by the presence of daughter products from the breakdown of tetrachloroethene (PCE) and trichloroethene (TCE) including cis-1,2-dichloroethene (cDCE), vinyl chloride (VC), and ethene. Acetylene can be produced by the abiotic reaction of PCE or TCE with ferrous sulfide (Butler and Hayes 2000). 1,1,1-Trichloroethane (1TCA) breaks down to 1,1-dichloroethene (1DCE), trans-1,2-dichloroethene (tDCE), 1,1-dichloroethane (1DCA), chloroethane (CA), and ethane. However, VC and ethene can also be generated from the breakdown of the 1TCA, 1DCA, and 1DCE. Based on a review of the site historical data, it appears that the biological degradation process is limited by the availability of organic carbon.

3.4 Technology Description

Anaerobic bioremediation, also referred to as reductive dechlorination, of chlorinated solvents is a well documented process that converts chlorinated ethenes and ethanes to innocuous gases.

The following technology description is from a report entitled "Cost and Performance Report – In Situ Anaerobic Bioremediation Pinellas Northeast Site Largo, Florida" prepared for the U.S. Department of Energy (1998) by Sandia National Laboratories and Hazardous Waste Remedial Actions Program.

Bacteria metabolize soluble organic and inorganic compounds to provide energy for the growth and maintenance of bacterial cells. The complex organic molecules that bacteria consume are converted to new cells and various simpler compounds, such as carbon dioxide, that are released back into the environment. This process is referred to as biodegradation. Biodegradation has been used very cost effectively for more than a century in public and industrial wastewater treatment systems. Since bacteria occur naturally in both soil and ground water environments, bioremediation technologies attempt to stimulate the activity of these naturally occurring (or introduced bacteria) to degrade contaminants in a cost-effective manner. Bioremediation is being considered more often as the processes that control the biological degradation of contaminants in soil and ground water become better understood.

In order to produce new bacterial cells, bacteria require carbon, nitrogen, phosphorus, and energy sources, as well as a number of trace minerals. Electrons are released by the biochemical reactions that metabolize complex organic compounds for energy. Biological systems capture this biochemical energy through a series of electron transfer (redox) reactions. The bacteria that are most commonly used in bioremediation systems use organic compounds as their source of carbon and energy; these carbon compounds are referred to as electron donors. Bacterial respiration requires that some chemical compound is available to act as a terminal electron acceptor. Common electron acceptors used by bacteria include oxygen, nitrate, sulfate, Fe^{3+}, and carbon dioxide.

Recently, a class of anaerobic bacteria has been identified that uses halogenated organic compounds as their electron acceptors. The chlorinated VOCs present in the soil and ground water at the Northeast site are among the halogenated organic compounds that can be used in this manner. Halogenated compounds have a high oxidation state; and when a halogen (e.g. chlorine) is chemically replaced by hydrogen, the oxidation state of the chemical is reduced. This process is referred to as reductive dehalogenation, and it forms the basis of the anaerobic process used by the in situ bacteria at the Northeast site. Under anaerobic conditions, chlorinated compounds can be degraded via reductive dehalogenation reactions to successively lower chlorinated degradation products, and finally to compounds of significantly lower toxicity. This process is illustrated for PCE below.

$$\underset{\text{step 1}}{\text{PCE} \rightarrow} \underset{\text{step 2}}{\text{TCE} \rightarrow} \underset{\text{step 3}}{\text{DCE} \rightarrow} \underset{\text{step 4}}{\text{VC} \rightarrow} \text{ethene, ethane}$$

Biological activity is frequently limited by the availability of a single growth factor (e.g. electron acceptor, electron donor, nitrogen, etc.) and supplying the proper growth factor can often

stimulate bacterial growth and biodegradation rates. For in situ bioremediation applications, nutrients or electron acceptors are often injected into the contaminated area to enhance the existing microbial degradation processes. Effectively delivering nutrients requires that factors such as site permeability and geochemistry be considered. Each class of contaminant varies in its susceptibility to biodegradation and factors such as aquifer oxidation-reduction potential, microbial ecology, and contaminant toxicity will affect the success of bioremediation at a site. The effective application of in situ bioremediation therefore depends upon careful consideration of the geologic and hydrologic properties at the site and on the type and concentration of contaminants to be treated.

Evaluations of the monitoring data from the Northeast Site suggested that microbial dechlorination is occurring naturally. cDCE and vinyl chloride (VC) are degradation products of TCE that were measured in high concentrations, but were not contaminants originally disposed of at the site, which suggests that a population of dechlorinating microorganisms is relatively active at Pinellas.

The report continues on to outline the technology advantages and disadvantages which are listed below:

Technology Advantages

- Contaminants are treated in situ with little waste generation
- Contaminant degradation can be relatively fast
- Bioremediation is capable of reducing contaminants to very low levels
- The process stimulates a microbial population that can continue to feed off the dissolved phase of a continuing source after nutrient injection ceases, and
- Often provides a low overall remediation cost relative to other technologies.

Technology Disadvantages

- Contaminant degradation enhancement is dependent on adequate nutrient delivery to all areas of contamination before the nutrients are directly metabolized, which often is primarily a function of site hydrogeology and the appropriate mixing of nutrients, contaminants, and active microbes,
- Site conditions (e.g. soil and ground water chemistry, reductive processes, etc.) must be conducive to the stimulation of biological activity to be effective,
- Bioremediation will not directly degrade contaminants occurring in an immiscible phase,
- High concentrations of contaminants often are toxic to microorganisms,
- Bioremediation may be difficult to optimize at sites with multiple contaminants of concern,
- Incomplete biodegradation of contaminants can lead to the generation of degradation products that are just as toxic or even more so than the parent contaminants, and
- Regulatory concerns over chemical injections into aquifers.

4.0 MATERIALS AND METHODS

4.1 Study Area

The study area encompasses a triangular area roughly 92 feet by 157 feet with a contaminated interval of 50 feet (from the water table at 10 feet to 60 feet) underlies the former drum storage area of the Photocircuits Corporation 31 Sea Cliff Ave, Glen Cove, NY facility. Eight monitoring points (MW-14, MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, and DMP-4) are being utilized to track the progress of the pilot study. Beginning in March 2001 groundwater samples were also collected from four additional wells (MW-8, MW-9, MW-12, and MW-13) to determine if the injected substrate had migrated away from the study area. It should be noted that these wells are not expected to be impacted by the bioremediation study.

4.2 Technical Challenges

The key technical challenges for this study are:

a. ability to move a carbon source throughout the contaminated area;
b. estimation of quantity of chlorinated compounds
c. determination of minimum level of TOC required to optimize reductive dechlorination

4.3 Key Design Criteria

The in situ anaerobic bioremediation pilot system was designed for two main objectives;

- develop a nutrient delivery system capable of providing a mixture of nutrients to the subsurface within the heterogeneous aquifer, such that the nutrients will be delivered to all levels in the treatment area within an approximately 24 month operating period, and
- deliver a sufficient quantity of substrate to the treatment area to last for approximately 24 months.

4.4 Treatment System Schematic and Operation

Figure 2 is a schematic of the pilot anaerobic biotreatment system showing the monitoring wells and the injection locations within the treatment cell. Injection points 1 to 7 were used in the first injection event. In this injection event, the nutrients were distributed throughout the vertical extent of the treatment area by a Geoprobe® rig at the beginning of the pilot. The Geoprobe® pushed a drivepoint to about 50 feet bgs. The drill rod was pulled back two feet to inject the fluids under pressure with a Rupe pump. The rod was then withdrawn four feet and additional fluid was injected. This process continued until about 22 ft bgs. Approximately 3,500 gallons of soybean oil emulsion containing soybean oil, soybean lecithin, and tap water (treated to remove chlorine) was injected into five points. Forty gallons of soybean oil was injected at an additional point. In addition to pressure injection of the emulsion followed by injection of chase water to disperse the nutrients, natural groundwater flow has dispersed the substrate.

During the period of February 25, 2002 to March 3, 2002, Terra Systems, Inc. constructed and utilized a low pressure injection system to inject substrate into the pilot area with twelve

injection wells (injection points 8-19). The injection system consisted of 7 one-inch wells installed to 60 ft. below land surface (bls) and 5 one-inch wells installed to 55 ft. bls. Eight of the wells were spaced 7.5 feet apart in a line. Two additional wells were placed on either side of the line. All of the wells had 20 ft. of PVC blank riser and 40 and 35 ft. of PVC screen (0.02 slot) respectively. The wells were installed using the Geoprobe™ direct-push method. Approximately 5,777 gallons of the emulsion was prepared and injected in February and April 2002. A total of 5,777 gallons of the emulsion containing 9,588 pounds of the soybean oil and surfactant mix, 94 pounds of a quick release substrate package, and 5.9 pounds of sodium bromide was injected.

4.5 Operating Parameters

The major operating parameters needed to assess the performance and cost of the bioremediation system were considered to be substrate concentrations and substrate longevity.

4.6 Materials

The test area was injected with emulsified soybean oil in August 29 to September 1, 2000. The key objective of the pilot study is to determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site. TSI formulated an emulsion containing soybean oil, lecithin (a soybean derivative that acts as an emulsifier), and water to provide required organic carbon. The soybean oil is broken down into smaller organic molecules and hydrogen that are then used by the dechlorinating bacteria. In the second injection event, soybean oil, a surfactant mix, a quick release substrate package, sodium bromide (a tracer), and activated carbon-treated water was used to prepare an emulsion.

5.0 RESULTS

The bioremediation pilot study at the Photocircuits Corporation site is being conducted to assess the applicability of substrate injection to accelerate the degradation of the chlorinated contaminants of concern and to identify optimal operating parameters. These data will be used to determine the expected costs and performance of a full-scale system at the site.

5.1 Demonstration Objectives and Approach

The objectives of the pilot in situ bioremediation project are as follows:

- Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.
- Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.
- Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.
- Determine what role bioremediation technology has in the overall cleanup strategy for the site.

5.2 Performance Evaluation Criteria

The performance criteria considered in evaluating this in situ anaerobic bioremediation system included:

- Substrate transport and utilization in the remediation study area,
- Contaminant degradation rates and the reduction in mass of the contaminants,
- Fate of chlorinated solvent degradation compounds, and
- Levels to which contaminants can be reduced.

The evaluation data were collected by a monitoring program of eight field sampling events over a 22 month period.

5.3 Organization of Data

The analytical data from the pilot collected from each of the seven sampling events are summarized in the following five tables.

- Table 1 presents the volatile organic data (VOCs), final biodegradation byproducts (ethene and ethane), important electron acceptors (total iron, sulfate, nitrate, and methane), and electron donor as represented by total organic carbon (TOC).

- Table 2 converts the concentrations of the chlorinated ethenes and chlorinated ethanes to micromolar units so that one unit of PCE is equivalent to one unit of TCE, cDCE, VC, and ethene. Similarly one unit of 1TCA is equivalent to one unit of 1DCE, tDCE, 1DCA, CA, or ethane.

- Table 3 presents the field data collected in January, April, and June 2002.

- Table 4 summarizes the changes between the samples collected within the pilot cell immediately after the oil emulsion injection and the samples collected twenty-two months later. For the downgradient wells, Table 5 summarizes the percent changes between the sample collected on 3/28/01 and the sample collected on 1/9-12/02 for well MW-9 and between 3/28/01 and 6/26/02 for wells MW-8, MW-12, and MW-13. For wells MW-14 and MW-7, samples could not be collected in April 2002 or June 2002 because of the accumulation of emulsion. Positive changes indicate that the concentrations of the analyte have decreased. A negative change indicates that the concentrations have increased. In a number of cases, the contaminants were not detected in the initial samples collected after emulsion injection or in the samples collected after twenty-two months. In these cases, the percent change was calculated using the analyte detection limit and the percent changes are designated as greater than (>) or less than (<) the calculated change.

- Table 5 summarizes the changes in the chloroethenes, chloroethanes, electron acceptors, and electron donor for all wells from the beginning of the pilot in August-September 2000 to January 2002 or June 2002.

5.4 Project To Date Results

The following table summarizes the status of the key performance measures for this project as of January, 2002. Details are described in subsequent sections..

Performance Measures	Values/Results
Treatment Volume: Soil Ground Water Treated:	 Approximately 92' X 157' X 60', 866,640 ft^3 Approximately 1,620,617gallons
System substrate transport effectiveness:	Demonstrated distribution throughout pilot area
Substrate effectiveness:	Enhanced dechlorination
Substrate viability	Lasted for more than one year
Total volatile contaminant degradation rates; 100 mg/L concentration levels 1 – 100 mg/L concentration levels	 301 µg/L-day 1.8 to 26 µg/L-day
Reduction of total contaminants of concern:	Achieved reductions of 45% to 95% except in MW-14 and MW-7 (through 1/8/02), and SMP-1
Chlorinated solvent degradation product production	General decline in all contaminants with some temporary increases in degradation products, followed by reduction of the degradation products themselves by biological degradation
Waste generated	None
Achievable contaminant reduction levels:	Estimated 90% within 52 months

5.4.1 Chlorinated Ethene Results

In the monitoring wells within the pilot cell, cis-1,2-DCE, VC, and ethene are the predominant chlorinated ethenes with little of the parent compounds, PCE or TCE, being detected. Trans-1,2-

DCE is a minor product, present at 1.1% or less of the total chlorinated ethenes. Chlorinated ethenes concentrations greater than 1,000 µg/L were initially only detected in SMP-1 and DMP-3.

PCE concentrations have increased slightly in SMP-4 from 7/11/01 to 6/25/02. PCE has generally not been detected in the remaining wells. TCE concentrations have increased in SMP-1, DMP-1, SMP-4, and to a lesser extent in MW-7 (through the last sampling point for this well in January 2002). The increases may be a result of dissolution of PCE and subsequent biodegradation to TCE, dissolution of TCE from a source zone, or an inadequate supply of substrate. TCE concentrations in SMP-1 increased from <34 µg/L on 8/31/00 to a maximum of 26,600 µg/L on 4/2/02. However, TCE concentrations in SMP-1 declined greatly between 4/2/02 and 6/25/02 to 41 µg/L as VC and ethene increased; the dechlorination was attributed to the increased substrate availability in this area. There were increases in cDCE concentrations in wells SMP-1 and DMP-1. cDCE concentrations peaked in SMP-1 in April 2002 and are declining now. Over the 22 months of pilot operation, cDCE concentrations have declined in wells MW-7 and SMP-4 by between 79 and 82%. VC concentrations have increased in wells MW-14 and SMP-1. Decreased VC levels have been observed in wells MW-7, DMP-1, SMP-3, DMP3, and SMP-4 with reductions of >66 to 97 percent. VC was not detected in June 2002 in wells SMP-3 and DMP-4.

As previously discussed, the goal of the process is to convert PCE into ethene because the ethene is considered to be environmentally acceptable. Ethene has not been associated with long-term toxicological problems and is a natural occurring plant hormone (Sims et al 1991). Unfortunately, given the field conditions, it is difficult to conduct a material balance. Ethene may be converted to carbon dioxide, ethane, or another product. Ethene may also be transported away with the groundwater, or production of ethene may have slowed due to some limitation on the microbial population including lack of substrate, insufficient nutrients, or lower concentrations of the parent compounds.

Ethene concentrations have increased in wells MW-14 (through1/8/02), MW-7 (through 1/8/02), SMP-1 (through 6/25/02), SMP-3 (through 6/25/02), and DMP-3 (through 6/25/02 from the initial levels observed on 8/31/00-9/1/00. Ethene concentrations for the other three wells of the pilot were lower than measured initially in September 2000. The continued presence of ethene in all of the wells in the pilot area shows that complete dechlorination of the chlorinated ethenes is occurring. Low levels of acetylene, an abiotic degradation product from the reaction of PCE or TCE with ferrous sulfide and ferrous disulfide, were detected in wells MW-14, SMP-1, and SMP-3 in January, April, and June 2002

The addition of soybean oil emulsion has resulted in an increase in intermediate and final daughter products from the chlorinated ethenes in pilot area wells MW-14, MW-7, SMP-1, SMP-3, and DMP-3. Well DMP-4 has ethene only.

In the downgradient monitoring wells sampled in March 2001, July 2001, January 2002, April 2002, and June 2002, three of the four wells had parent compounds PCE and/or TCE (MW-8, MW-12, and MW-13) with concentrations greater than 1,000 µg/L of chlorinated ethenes only detected in MW-12. Ethene has increased in MW-12 and has not been detected in the other

downgradient wells. Increases in the VC and ethene concentrations were noted in MW-12 concurrent with the reduction in the TCE and cDCE concentrations. The emulsion injections appear to have had an effect on MW-12 based upon the increases in ethene, methane, and TOC. TOC was not detected in MW-12 and MW-13 in June 2002. The very low levels of TCE and cDCE found in MW-8 have fallen to non-detect levels in April and June 2002. PCE, TCE, cDCE, and VC concentrations have decreased in MW-13, but ethene has not been detected in this well. The area around MW-13 appears to be substrate-limited and has largely not been impacted by the oil emulsion injection.

5.4.2 Chlorinated Ethane Results

The analytical data for the pilot test to date provides evidence for biodegradation of the chlorinated ethanes. Wells DMP-1, SMP-3, DMP-3, and SMP-4 had the highest initial concentrations of total chlorinated ethanes with greater than 1,000 µg/L. 1TCA was the primary chlorinated ethane contaminant in wells SMP-3 and DMP-3. Reduced products such as 1,1-dichloroethane, chloroethane, and ethane predominated in wells MW-14, MW-7, SMP-1, DMP-1, SMP-4, and DMP-4.

Well SMP-3 has shown a 95% (178,000 µg/L to 8,070 µg/L) reduction in the 1TCA concentrations. 1TCA levels in wells DMP-3, SMP-4, and DMP-4 have dropped by 93 to 98 percent. Between 54% (5,230 to 2,410 µg/L) and 72% (38,200 to 10,800 µg/L) reductions in the 1DCA concentrations were observed in DMP-3 and SMP-3, respectively. Large reductions in the 1DCE concentrations have been observed in wells SMP-3 (47%), DMP-3 (89%), and SMP-4 (99%). CA concentrations have declined by 98% in DMP-1 (3,290 to 37 µg/L) and by 88% in SMP-4, and 45% in DMP-4. Based upon these results and laboratory studies currently underway with an anaerobic culture derived from the Photocircuits groundwater, we believe that direct utilization of 1TCA and 1DCA may be occurring rather than a reductive dechlorination reaction where daughter products such as CA are produced and degraded. Acetic acid has been reported as a byproduct of 1TCA degradation (Lee and Davis 2001). Alternatively, sulfides generated from the reduction of sulfate may be reacting abiotically with the 1TCA and 1DCA (Gander et al. 2001).

Well SMP-4 has shown decreases in the 1TCA, 1DCA, CA, and ethane concentrations over the twenty-two months following the first injection of the oil emulsion. There was a rebound in concentrations of these compounds between December 2000 and January 2002 in SMP-4. When substrate levels were elevated after the second application of EOS^{TM}, the 1TCA and 1DCA concentrations dropped. Concentrations of 1TCA, 1DCA, and 1DCE higher than initial levels were observed in wells MW-14 (1/8/02), MW-7 (1/8/02), SMP-1, DMP-1, and DMP-4. However, further degradation products CA and ethane levels are elevated in wells MW-14, MW-7, SMP-3, DMP-3, and SMP-4.

Relatively low levels of 1TCA and daughter products were found in downgradient monitoring wells MW-12 and MW-13, which were first monitored for this program in March 2001. No chlorinated ethanes were found in MW-8 or MW-9. 1DCA and ethane concentrations have increased in MW-12, but 1DCE concentrations have fallen. In MW-13, 1TCA, 1DCA, 1DCE, and ethane concentrations have decreased. The substrate injections have had little impact on the

downgradient wells except potentially MW-12 where the TOC increased to 73 mg/L in April 2002, but then fell to <0.51 mg/L in June 2002.

5.4.3 Other Organic Compounds Results

Several other organic compounds were detected in the groundwater including acetone, methylene chloride, 2-butanone, toluene, benzene, p-ethyltoluene, 1,3,5-trimethylbenzene, 2-chlorotoluene, 4-chlorotoluene 1,2,4-trimethylbenzene, naphthalene, o-xylene, n-propylbenzene, and methyl tert butyl ether (MTBE). Over the twenty-two months of the pilot operation to date, acetone concentrations decreased by >99% in DMP-1, but increased in MW-14 (through 1/8/02) and DMP-3 and SMP-4. Methylene chloride decreased in many wells with declines by as much as 100 percent in SMP-3, >98% in SMP-1, 98% in DMP-1, 79% in DMP-3, 97% in SMP-4 (through 1/8/02), and 46% in DMP-4. Methylene chloride can also be anaerobically degraded. Toluene concentrations have declined in six wells, but increased in two wells, MW-14 (through 1/8/02) and SMP-1. Toluene can be also degraded anaerobically. The addition of soybean oil may have little effect on its biodegradation of toluene as dechlorinators are probably not involved in the biotransformation of toluene. 2-Chlorotoluene concentrations declined in wells SMP-4 and DMP-4, but increased in MW-7 (through 1/8/02) and DMP-1. 2-Chlorotoluene may be biodegraded to toluene and potentially further under anaerobic conditions. MTBE was first detected at 9.0 µg/L in SMP-3 in July 2001. MTBE was found at levels up to 125 µg/L in DMP-3, SMP-1, SMP-3, and DMP-4 in January 2002. MTBE was detected only in monitoring well DMP-3 (26.6 µg/L) in June 2002. Either the MTBE has flushed through the system or there was a problem with the laboratory analyses.

Few of the other contaminants were found in the downgradient wells. 2-Chlorotoluene has increased in MW-12 by 394%, but declined by 85% in MW-13 between 3/28/01 and 6/26/02. 4-Chlorotoluene has only been found in MW-13; its concentrations have increased since 3/28/01. A low level of o-xylene was found in MW-12 in January 2002, but none was detected in June 2002. Acetone, benzene, and 2-chlorotoluene have been detected in MW-13, but concentrations of each have decreased.

5.4.4 Sum of VOAs

The sum of the concentrations of all of the contaminants in each well was calculated excluding the final degradation endproduct gases, ethene and ethane. The sum of the VOAs has declined by up to 95% in DMP-1 with large decreases in SMP-3 (91%), DMP-3 (53%), SMP-4 (92%), and DMP-4 (45%). The sum of VOAs has increased by 4529% in MW-14 through 1/8/02 as the contaminated groundwater displaced during injection came back into the well and potentially as VOCs adsorbed into the oil were released. Increases in the sum of VOAs were also observed to a lesser degree in MW-7 (-33 through 1/8/02). The overall average of the sum of the volatiles has declined by 66% over the course of the pilot. This average includes the wells sampled on 6/25/02 and the two wells (MW-7 and MW-14) last sampled on 1/8/02. Increased biodegradation rates are expected as substrate limitations are overcome with the second injection of substrate.

A first order degradation half-life of 578 days was calculated for the average total volatile contaminants within the pilot cell. Based upon this degradation rate, 90 percent of the total contaminants should be removed within 52 months.

Since 3/28/01, the total volatiles in the downgradient wells outside of the influence of the substrate injection have fallen in MW-8 and MW-13 (91%), but increased in MW-12 (-46%).

5.4.5 Substrate Distribution

The total organic carbon concentrations in June 2002 ranged from 24 mg/L in DMP-1 to 3,440 mg/L in SMP-4. Wells MW-7 and MW-14 contained the emulsion in June 2002 and were not sampled. They presumably contain very high levels of TOC. TOC levels were below 50 mg/L in June 2002 only in well DMP-1. A substrate level of 50 mg/L TOC should provide sufficient carbon to support dechlorination and other electron accepting processes such as methanogenesis and sulfate-reduction. TOC levels increased from the April sampling event in all other wells except SMP-3 as a result of the February-April 2002 injection event. TOC levels increased slightly in the downgradient well MW-8, but declined to below detection limits in MW-12 and MW-13. Downgradient wells MW-8, MW-9, MW-12, and MW-13 appear to be substrate-limited.

5.4.6 Electron Acceptor Results

As the microbes breakdown the emulsion, sulfate would be depleted and the concentrations of iron and methane would increase. Nitrate-nitrogen was present in June 2002 at low concentrations of <0.025 to 0.009 mg/L. and is a minor electron acceptor. The predominant electron acceptor in the groundwater in June 2002 was sulfate with concentrations that ranged from 119 mg/L in SMP-3 and SMP-4 to 590 mg/L in DMP-1. Sulfate concentrations have declined from the initial concentrations in September 2000 in wells MW-14 (92% through 1/8/02), DMP-1 (98% from 29,600 to 590 mg/L) as would be expected with consumption of the oil emulsion. However, sulfate levels have increased in MW-7 (though 1/8/02), DMP-3, and DMP-4 over the course of the pilot. The average sulfate concentration in the cell has declined by 92%. Total iron concentrations within the pilot in June 2002 ranged from 4.63 mg/L in SMP-3 to 1,010 mg/L in SMP-4, which indicated that iron is also an important electron acceptor. Total iron concentrations have increased in four of the eight wells in the pilot area. The drop in dissolved iron concentrations in the other wells may be due to precipitation of the ferrous iron with sulfide produced from the utilization of sulfate. During the most recent sampling event in June 2002, methane was detected in all wells with methanogenic conditions (>1,000 µg/L) in MW-14 (though 1/8/02), MW-7 (though 1/8/02), SMP-1, SMP-3, DMP-3, and SMP-4. Methane concentrations have increased in six wells in the pilot area between September 2000 to January 2002 or June 2002.

Well MW-8 appears to be under aerobic conditions based upon the presence of dissolved oxygen, nitrate, and sulfate, and the low levels of iron and methane. This well is largely uncontaminated. While MW-9 has little organic contamination, it appears to have been impacted by the biodegradation processes upgradient as it has elevated iron and methane levels and decreased sulfate levels. Well MW-12 is under methanogenic conditions based upon the elevated methane levels. Iron and sulfate are also high in MW-12. Methane concentrations are lower in MW-13 and there is little iron. Nitrate and sulfate are present suggesting that well MW-13 is under nitrate-reducing conditions.

5.4.7 Field Parameters

Field parameters including water level, pH, temperature, specific conductivity, redox potential, dissolved oxygen, and bromide (a tracer added with the emulsion) were collected in January, April, and June 2002 for wells MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, DMP-4, and MW-8. Field parameters were available for downgradient wells MW-9, MW-12, and MW-13 for the April 2 and June 26, 2002 sampling events. The water levels ranged between 6.42 feet (SMP-1) to 7.96 feet (MW-8) below the top of the casing for wells from which this data was collected in January 2002. The pH was generally neutral, between 6.3 and 7.6. Well SMP-3 had an elevated pH readings, 8.7-9.9. The basic conditions could inhibit microbial degradation. The pH dropped to slightly acidic conditions of 5.3 in SMP-4. Downgradient wells MW-8, MW-12 and MW-13 were slightly acidic, 6.2 to 6.6. Groundwater temperatures ranged between 11.5 to 19.2 °C. In general the specific conductivity of the groundwater was high, between 2,660 and 5,890 umhos/cm. Downgradient wells MW8 and MW-9 had lower specific conductivity readings of 183 to 200 μmhos/cm. Downgradient wells MW-12 and MW-13 had higher specific conductivity levels.

Negative redox potentials of –25 (SMP-4) to -176 mV (DMP-4) were found in the wells within the pilot cell in June 2002. Downgradient wells MW8 and MW-9 had positive redox potentials in January to June 2002, which is consistent with the low levels of contaminants found in these wells. Although well MW-13 has higher contaminant levels, its redox potential was also positive. Low (<1.0 mg/L) dissolved oxygen readings were observed in wells DMP-3 and DMP-4. Higher dissolved oxygen levels were found in SMP-1, DMP-1, SMP-3, and SMP-4; the high dissolved oxygen levels are not consistent with the low redox potentials and anaerobic conditions found in these wells. Bromide was injected with the emulsion. Wells SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, and DMP-4 had bromide levels of greater than 10 mg/L. These wells generally had elevated TOC levels. Bromide levels increased between April and June 2002 in all monitoring wells within the cell except DMP-4. The highest bromide levels were in wells DMP-1, DMP-3, and SMP-4. Wells DMP-3 and SMP-4 had high TOC concentrations.

6.0 DISCUSSION

Previous studies have demonstrated the anaerobic dechlorination of PCE using aquifer solids and water in the laboratory (Parsons et al. 1985, Scholz-Muramatsu et al. 1995, and DiStefano et al. 1991). Previous field studies have also demonstrated the anaerobic dechlorination of PCE (Beeman et al. 1994, Ellis et al. 2000). Therefore, microbial reductive dehalogenation is a potential remedial mechanism for halogenated compounds in groundwater aquifers.

The objective of the technology is to convert PCE and 1TCA into ethene and ethane. The produced ethene is considered to be environmentally acceptable, because ethene has not been associated with long-term toxicological problems and is a natural occurring plant hormone (Sims et al. 1991). Furthermore, ethene is known to further biodegrade to carbon dioxide under aerobic environmental conditions (Beeman et al 1994).

VC has been thought to persist in anaerobic environments and to be more toxic to bacteria than the parent compounds (Barrio-Lage et al. 1991). However, subsequent work has clearly established that VC is biodegraded to ethene and ethane. The pattern of increase and disappearance of cDCE and VC is suggestive of microbial succession.

Conditions continue to be favorable for accelerated anaerobic biodegradation of the chlorinated solvents at the Photocircuits site based upon the following positive results from the pilot to date including:

- decreases in the parent compound concentrations observed in many wells, particularly the large drops in the 1TCA and 1DCA concentrations in wells SMP-3 and DMP-3
- increases in the daughter products including final products ethene and ethane in many of the wells.
- good distribution of substrate and its consumption
- prevalence of reducing conditions based upon the removal of sulfate and the production of dissolved iron and methane

7.0 CONCLUSIONS

Although the pilot study is an on-going program, there is now sufficient data to facilitate a comparison of the project to date results with the project's objectives. The following summary presents the project objectives in bold with the results.

Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.

The overall average of the sum of the volatiles has declined by 66% over the course of 22 months. Increases in intermediate and final daughter products from the chlorinated ethenes and ethanes have been observed in all of the primary monitoring wells.

Degradation rates for the total VOCs are as high as 301 µg/L per day in higher concentration areas. In areas with lower total volatile concentrations, degradation rates range from 1.8 to 26 µg/L per day. Wells MW-7 and MW-14 have shown increases in total VOCs through their last sampling point in January 2002. An increase in the total VOCs was also noted in well SMP-1. Between April and June 2002, a large decrease in the parent compounds TCE and cDCE was observed in SMP-1 with increases in VC and ethene.

Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.

A first order degradation half-life of 578 days was calculated for the average total volatile contaminants within the pilot cell. This average includes the wells sampled on 6/25/02 and the two wells last sampled on 1/8/02. Based upon this degradation rate, 90% of the total contaminants should be removed within 52 months.

Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.

Total organic carbon (TOC) levels in excess of 50 mg/L were established in all eight of the primary monitoring wells in the study area. The TOC levels after system start up ranged from 39 mg/L to 23,500 mg/L. TOC levels declined from the beginning of the pilot in most wells as the emulsified oil was utilized. TOC levels rose in all wells in the pilot cell after the second injection of the emulsion. Although it is not possible to do a mass balance because of site conditions, evidence of primary contaminant reduction combined with increases in intermediate and final daughter products strongly suggests that the TOC decreases are a result of biological utilization.

Determine what role bioremediation has in the overall remediation strategy for the site.

Based on the results to date, it appears that bioremediation can cost effectively destroy the contaminants in an acceptable time frame. As a consequence, it appears that bioremediation will be the primary treatment technology for contaminant destruction at this site.

The one unexplained observation is the increase in contaminant concentrations in MW-14 and MW-7 through 1/8/02, and in SMP-1. There are several potential reasons for the increased concentrations: 1) desorption of contaminants adsorbed to the soil due to enhanced biological activity may be contributing to the increase; or 2) contaminated groundwater displaced during the injection process could be moving back into the well. We are working to understand this phenomenon.

8.0 REFERENCES

Barrio-Lage, G. A., F. Z. Parsons, R. M. Narbaitz, P. A. Lorenzo, and H. E. Archer. 1990. Enhanced anaerobic biodegradation of vinyl chloride in ground water. *Environ. Toxicol. Chem.* 9:403-415.

Beeman, R. E., S. H. Shoemaker, J. E. Howell, E. A. Salazar, and J. R. Buttram. 1994. A field evaluation of in situ microbial reductive dehalogenation by the biotransformation of chlorinated ethenes. In R. E. Hinchee, A. Leeson, L. Semprini, and S. K. Ong, ed., *Bioremediation of Chlorinated and Polycyclic Aromatic Hydrocarbon Compounds*, Lewis Publishers, Boca Raton, FL. pp. 14-27.

Butler, E. C. and K. F. Hayes. 2000. Kinetics of the transformation of halogenated aliphatic compounds by iron sulfide. *Environ. Sci. Technol.* 34(3):422-429.

DiStefano, T. D., J. M. Gossett, and S. H. Zinder. 1991. Reductive dehalogenation of high concentrations of tetrachloroethene to ethene by an anaerobic enrichment culture in the absence of methanogenesis. *Appl. Environ. Microbiol.* 57(8):2287-2292.

Ellis, D. E., E. J. Lutz, J. M. Odom, R. J. Buchanan, M. D. Lee, C. L. Bartlett, M. R. Harkness, K. A. DeWeerd. 2000. Bioaugmentation for accelerated in situ anaerobic bioremediation. *Environmental Science and Technology*34(11):2254-2260.

Gander, J. W. G. F. Parkin, and M. M. Scherer. 2001. Geomicrobiological interactions among iron sulfide minerals and methanogenic consortia. In Situ and On-Site Bioremediation Poster Abstracts. Sixth International Symposium, June 4-7, 2001. San Diego, CA. Section C8.

Interstate Technology and Regulatory Cooperation Work Group (ITRC). 2001. *Technical and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater*. Prepared by the In Situ Chemical Oxidation Work Group, June.

Lee, M. D. and J. W. Davis. 2000. Natural remediation of chlorinated organic compounds. In Swindoll, M., R. G. Stahl, Jr. and S. J. Ells, editors. *Natural Remediation of Environmental Contaminants: Its Role in Ecological Risk Assessment and Risk Management*. SETAC Press, Pensacola FL. p. 199-245.

Parsons, F., G. B. Lage, and R. Rice. 1985. Biotransformation of chlorinated organic solvents in static microcosms. *Environ. Toxicol. Chem.* 4:739-742.

Scholz-Muramatsu, A. Neumann, M. Meβmer, E. Moore, and G. Diekert. 1995. Isolation and characterization of *Dehalospirillum multivorans* gen., sp. Nov., a tetrachloroethene-utilizing, strictly anaerobic bacterium. *Arch. Microbiol.* 163:48-56.

Semprini, L., Grbic-Galic, D., McCarty, P.L, and Roberts, P.V., 1992. Methodologies for Evaluating In-situ Bioremediation of Chlorinated Solvents. EPA/600/R-92/042.

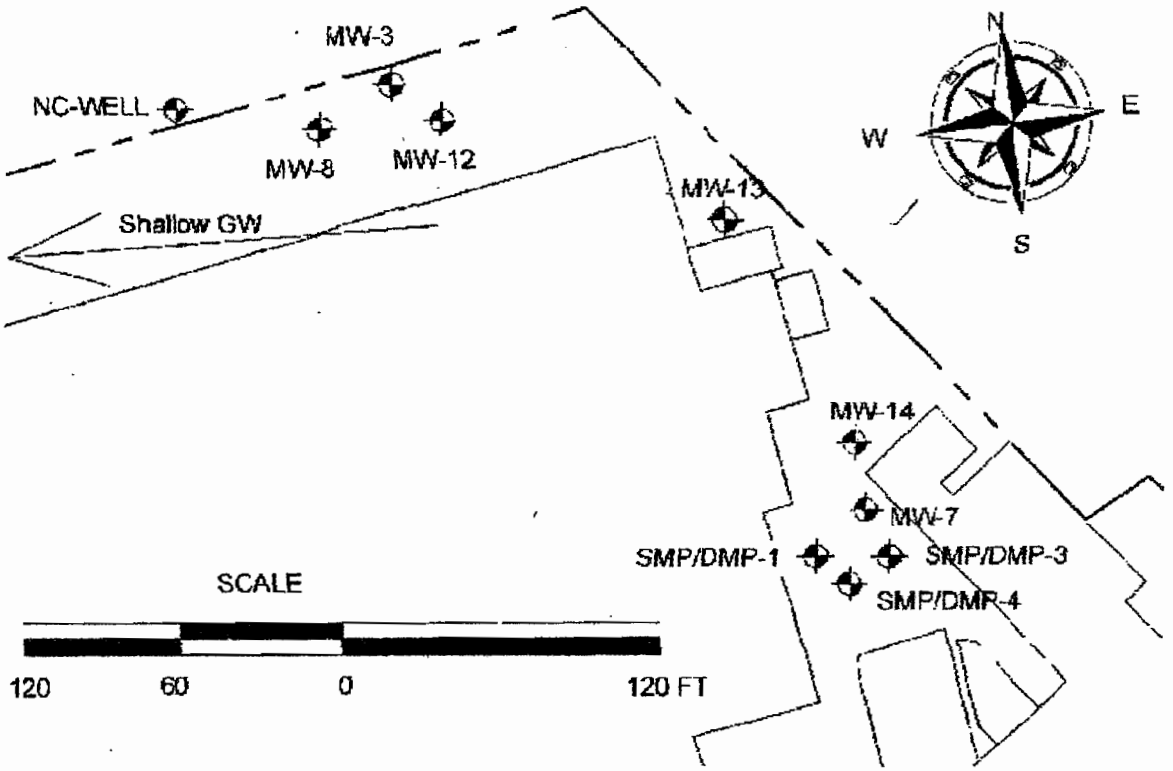
Sims, J. L., J. M. Suflita, and H. R. Russell. 1991. *Reductive Dehalogenation of Organic Contaminants in Soils and Ground Water.* EPA/540/4-90/054. Superfund Technology Support Center for Ground Water, U. S. EPA, Ada, OK.

U.S. Department of Energy. 1998. Cost and Performance Report – In Situ Anaerobic Bioremediation, Pinellas Northeast Site, Largo, Florida. Innovative Treatment Remediation Demonstration. April 1998. Sandia National Laboratories, Albuquerque, NW and Hazardous Waste Remedial Actions Program, Oak Ridge, TN. 33 p.

United States Environmental Protection Agency. 1996. "Pump-and-Treat Ground-Water Remediation, A Guide for Decision Makers and Practitioners", EPA/625/R-95/005, July, 1996, p.2.

FIGURES

Figure 1. Site Map Showing Monitoring Wells



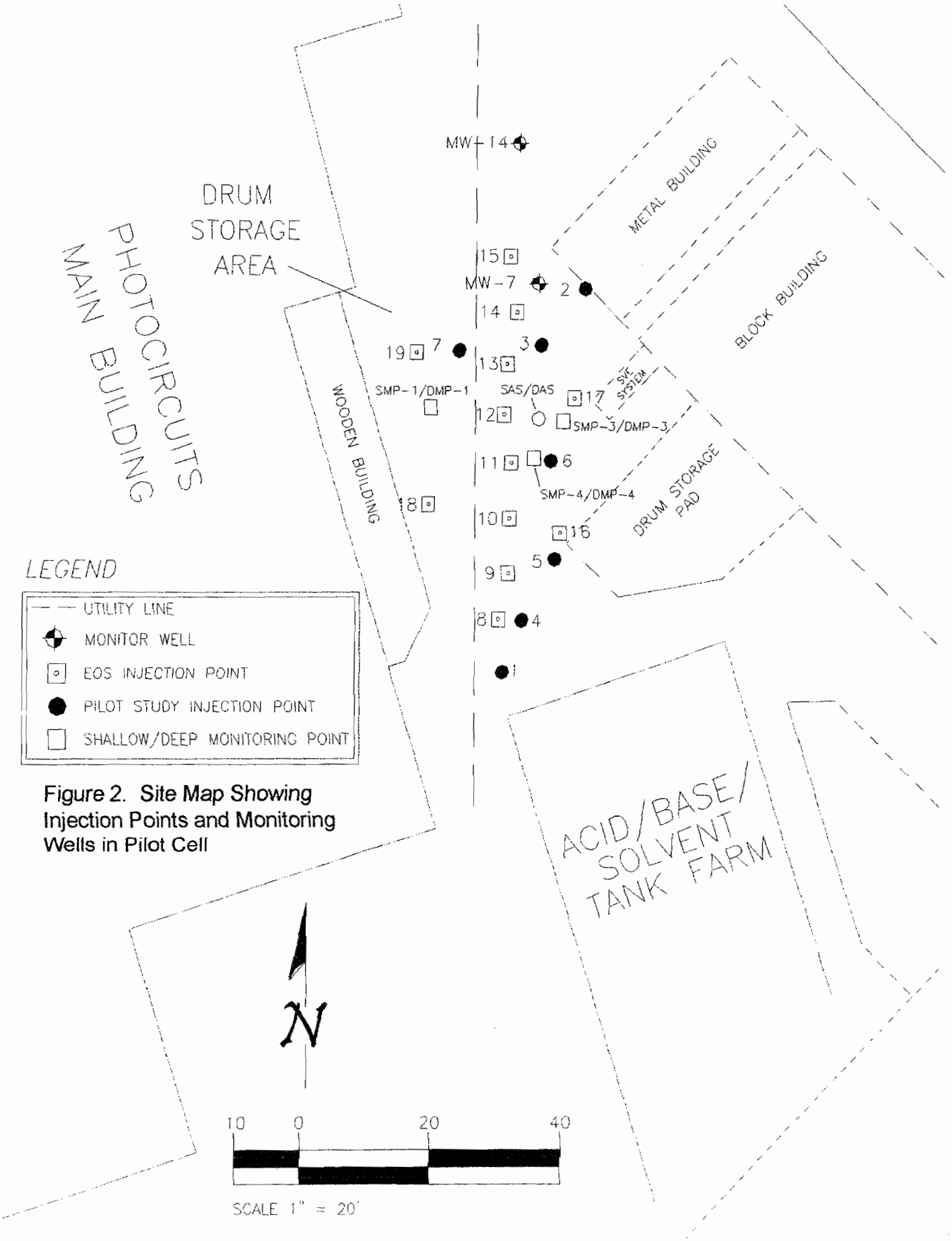


Figure 2. Site Map Showing Injection Points and Monitoring Wells in Pilot Cell

TABLES

Table 1. Photocircuits Anaerobic Pilot Analytical Summary

Well		MW-14						MW-7					
Date		8/31/00	10/19/00	12/20/00	3/28/01	7/11/01	1/8/02	8/31/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02
Days		0	49	111	209	314	495	0	49	111	208	314	495
Tetrachloroethene	µg/L		<1.4	<0.40	<5.5	<4.0	<2.4	<0.40	<0.56	<0.40	<2.2	<0.20	<0.12
Trichloroethene	µg/L	<0.85	<1.35	<0.85	<10	<3.4	<3.4	<0.85	19.3	<0.85	<4	16	2.7
cis-1,2-Dichloroethene	µg/L	<0.95	<1.7	<0.95	<15	<2.8	<3.6	47.3	283	355	149	187	8.3
trans-1,2-Dichloroethene	µg/L	<1.35	<1.40	<1.35	<11	<2.8	<5.8	<1.35	<0.56	<1.35	<4.4	2.6	2.1
Vinyl Chloride	µg/L	<1.75	10.6	<1.75	114	145	173	39.3	67.1	139	60	63.9	10.5
Ethene	µg/L	43	47	60	65	130	90	63	170	110	33	94	110
Acetylene	µg/L						5.7						<1.2
1,1,1-Trichloroethane	µg/L	14.4	<1.7	8.9	994	2040	1520	<0.55	<0.62	<0.55	<4	<0.16	<0.14
1,1-Dichloroethane	µg/L	126	216	293	9230	18800	14100	122	214	268	135	207	193
1,2-Dichloroethane	µg/L	<0.80	<0.95	<0.80	<10	34.2	<3.2	<0.80	<0.38	<0.80	<4	<0.13	3.7
1,1-Dichloroethene	µg/L	<1.05	6.3	<1.05	443	751	542	<1.05	<0.96	<1.05	<3.6	1.9	<0.22
Chloroethane	µg/L	15.6	<1.25	<1.65	132	298	501	258	181	201	160	269	390
Ethane	µg/L	52	69	48	34	66	49	<6	130	81	34	71	68
Acetone	µg/L	97.8	170	126	<74	551	986	<9.45	52.2	<9.45	<29.6	18.5	<2.3
Methylene Chloride	µg/L	15.1	<1.50	<1.0	220	156	134	12.8	6.0	<1	51.6	3.9	8.0
2-Butanone	µg/L	124	75.3	<5.1	<125	863	344	<5.1	<1.64	<5.1	<50	<6.25	17.2
Toluene	µg/L	3.0	<0.80	<0.80	<7.5	32.4	25	6.2	8.4	8.3	<3	8.6	0.95
Benzene	µg/L	<0.70	<0.70	<0.70	<5	<2.6	<3.4	4.0	3.5	<0.7	<2	2.8	6.5
p-Ethyltoluene	µg/L	<1.2	<1.05	<1.2	<8	<4.4	<4.8	<1.2	<0.68	<1.2	<3.2	<0.22	<0.24
1,3,5-Trimethylbenzene	µg/L	<0.60	<1.50	<0..60	<17	<2.2	<2.4	<0.60	<0.60	<0.6	<6.8	<0.11	<0.12
2-Chlorotoluene	µg/L	<0.85	<1.35	<0.85	<10.5	<3.2	<4.2	<0.85	5.2	<0.85	<4.2	6.3	8.4
1,2,4-Trimethylbenzene	µg/L	<0.65	<1.25	<0.65	<11	<4.4	<2.6	<0.65	<0.50	<0.65	<4.4	1.2	0.93
Naphthalene	µg/L	<1.35	<0.90	<1.35	<9.5	<8.2	<5.4	<1.35	<0.36	<1.35	<3.8	1.2	<0.27
o-Xylene	µg/L	<0.40	<1.35	<0.40	<8	<3.2	<3.2	<0.40	<0.54	<0.4	<3.2	1.1	<0.16
n-Propylbenzene	µg/L	<0.70	<1.40	<0.70	<10.5	<6.2	<2.8	<0.70	<0.56	<0.7	<4.2	<0.31	<0.14
Methyl T-Butyl Ether	µg/L	<1.25	<1.15	<1.25	<14	<1.6	<3.6	<1.25	<0.46	<1.25	<5.6	<0.080	<0.18
Sum VOAs (w/o Gases)	µg/L	396	478	428	11133	23671	18325	490	840	971	556	791	652
Methane	mg/L	44	58	380	1800	6400	8050	660	1900	760	1050	5930	5050
Iron, Total	mg/L	55.2	13.2	69	197	188	279	2.22	1.84	3.93	6.72	8.78	13.1
Sulfate	mg/L	5470	779	32.6	307	1270	441	104	117	264	203	68.9	949
Nitrate-Nitrogen	mg/L		0.15	0.17	<0.025	<0.0015	<0.13		<0.015	0.023	0.029	0.017	0.085
Total Organic Carbon	mg/L	23500	868	1990	2590	3530	2630	38.8	53.1	60	72.9	58.5	1.67

Table 1 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-1								DMP-1							
Date		8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02	8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Days		0	48	111	208	314	495	579	663	0	48	111	208	314	495	579	663
Tetrachloroethene	µg/L	<16	<0.40	<22	<5.5	<2.0	<6.0	<12	<5.5	<0.40	<0.080	<0.40	<5.5	<1.0	<0.60	<0.48	1.1
Trichloroethene	µg/L	<34	79	860	1530	25.3	4410	26600	41	<0.85	<0.17	<0.85	<10	4.5	<0.85	29.3	10.5
cis-1,2-Dichloroethene	µg/L	24900	37500	30100	<0.27	12300	18000	42500	25700	50.4	1.70	17.4	73.5	38.4	<0.90	44.3	62.1
trans-1,2-Dichloroethene	µg/L	<54	69.9	<40	132	34.5	68.5	376	<15.5	<1.35	<0.27	<1.35	<11	<0.70	<1.4	3.9	2.8
Vinyl Chloride	µg/L	4710	5990	5090	4770	4230	3490	1780	8920	188	3.5	40	125	42.7	<4.25	62	25.4
Ethene	µg/L	930	2400	1140	900	1890	650	800	1820	560	1080	920	690	110	93	160	210
Acetylene	µg/L						<11	7.4	<1.2						<1.2	<1.2	<1.2
1,1,1-Trichloroethane	µg/L	<22	<0.55	<34	356	158	<7.0	<11	<13	<0.55	<0.11	<0.55	193	28.1	<0.70	<0.44	0.89
1,1-Dichloroethane	µg/L	506	486	628	708	536	456	366	295	91.8	17.6	357	1130	1320	423	240	412
1,2-Dichloroethane	µg/L	<32	<0.80	<17	<10	<1.3	<8.0	<11.5	<11.5	<0.80	<0.16	<0.80	<10	14.9	<0.80	<0.46	2.9
1,1-Dichloroethene	µg/L	<42	64.3	<27	184	55.1	143	296	50.5	<1.05	<0.21	<1.05	<9	<0.70	<1.10	<0.6	<0.27
Chloroethane	µg/L	<72	71.6	<53	<15	<1.8	<33.5	<30.5	<12.0	3290	43.4	232	159	193	97	69.7	36.9
Ethane	µg/L	<6	<6	<25	<25	<25	<12	<1.3	3.6	<6	<6	<50	<100	<50	0.8	<1.3	1.8
Acetone	µg/L	<378	<9.45	<166	<74	<14.4	<115	<156	<56.5	8670	139	557	<74	1150	<11.5	<6.24	48.8
Methylene Chloride	µg/L	482	43.1	<56	<20.5	11.9	<18.5	<27	<10.5	68.3	1.40	22.4	191	32.8	<01.85	<1.08	1.7
2-Butanone	µg/L	<204	<5.1	<68	<125	<62.5	<860	<250	<190	<5.1	<1.02	5.1	<125	<31.3	<86	<10	<3.8
Toluene	µg/L	<32	61.1	<19	126	51.4	55	194	114	36.5	2.80	24.1	40.5	9.1	<0.70	2.2	5.8
Benzene	µg/L	<28	4.40	<34	<5	<1.3	<8.5	<8	<10.5	<0.70	<0.14	5.5	<5	<0.65	<0.85	<0.32	<0.21
p-Ethyltoluene	µg/L	<48	<1.2	<20	<8	11.3	<12	<12	<8.0	2.9	<0.24	<1.2	<8	<1.1	<1.2	<0.4	1.4
1,3,5-Trimethylbenzene	µg/L	<24	<0.60	<20	<17	<1.1	<6.0	<10	<10	2.8	<0.12	<0.60	<17	<0.55	<0.60	<0.4	1.3
2-Chlorotoluene	µg/L	<34	16.3	<25	<10.5	47.3	<10.5	<13.5	<12.5	23.7	<0.17	18.2	<10.5	33.7	79.7	57.6	30.1
1,2,4-Trimethylbenzene	µg/L	<26	<0.65	<0.65	<11	15.7	<6.5	<8.5	<8.5	8.4	0.77	8.4	<11	4.8	4.7	3.4	3.2
Naphthalene	µg/L	<54	<1.35	<16	<9.5	21.2	<13.5	<7	<14.5	3.1	<0.27	<1.35	<9.5	<2.05	<1.35	<0.28	<0.29
o-Xylene	µg/L	<16	<0.40	<18	<8	11.4	<8.0	<10	<12.5	<0.40	<0.080	<0.40	<8	<0.80	<0.80	<0.4	0.82
n-Propylbenzene	µg/L	<28	<0.70	<17	<10.5	<3.1	<7.0	<10.5	<8.0	<0.70	<0.14	16.9	<10.5	<1.55	<0.70	<0.42	<0.16
Methyl T-Butyl Ether	µg/L	<50	<1.25	<25	<14	<0.80	117	<17	<9.0	<1.25	<0.25	<1.25	<14	<0.40	<0.90	<0.68	<0.18
Sum VOAs (w/o Gases)	µg/L	30598	44386	36678	7806	17509	26740	72112	35121	12436	210	1304	1912	2872	604	512	648
Methane	mg/L	3400	6200	2500	2060	3400	1100	2110	1890	8200	23000	10300	4660	730	330	160	520
Iron, Total	mg/L	19.8	11.6	15.1	11.1	29.9	16.4	18.3	11.2	88.5	4.45	3.1	21.7	8.65	15.9	4.11	6.8
Sulfate	mg/L	236	360	443	813	905	732	513	143	29600	37.7	179	715	1420	1200	2070	590
Nitrate-Nitrogen	mg/L		0.054	0.071	12.3	0.016	<0.13	0.046	<0.025		0.20	0.024	0.05	0.019	<0.13	<0.025	0.004
Total Organic Carbon	mg/L	91.7	83.4	88	59.7	45.9	23.8	63.1	125	299	224	137	132	54.5	8.14	41.1	24.3

Table 1 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-3					DMP-3										
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Days		0	49	111	208	314	495	579	662	0	49	111	208	314	495	579	662
Tetrachloroethene	µg/L	<80	<80	<8	13.7	12.2	<6.0	<24	<5.5	<16	60.5	<4.0	<1.1	72.3	34	<12	<2.2
Trichloroethene	µg/L	<170	<170	<17	<0.2	<1.7	<8.5	<34	<18	<34	<13.5	<8.5	<2	8.6	<8.5	<8	<7.2
cis-1,2-Dichloroethene	µg/L	<190	<190	<19	2.3	16.4	<9.0	<36	<12	<38	<17	<9.5	<3	14.9	<9.0	<10.5	<4.8
trans-1,2-Dichloroethene	µg/L	<270	<270	<27	<0.22	<1.4	<14	<56	<15.5	<54	<14	<13.5	<2.2	<1.4	<14	<10	<6.2
Vinyl Chloride	µg/L	<350	<350	<35	38.8	98.8	<42.5	<170	118	1040	928	818	145	785	654	397	113
Ethene	µg/L	84	98	39	18	110	180	220	260	430	450	310	290	490	360	220	620
Acetylene	µg/L						2.1	5.4	2.2						<1.2	<1.2	<1.2
1,1,1-Trichloroethane	µg/L	178000	235000	32600	33700	13100	14500	7610	8070	19700	14300	23400	793	24000	19500	11600	1350
1,1-Dichloroethane	µg/L	38200	47800	4770	<0.5	17600	8860	20500	10800	5230	4860	4200	764	3250	2260	3770	2410
1,2-Dichloroethane	µg/L	<160	<160	<16	6	20.6	<8.0	<32	<11.5	<32	<9.5	<8.0	<2	25.4	<8.0	<11.5	36.6
1,1-Dichloroethene	µg/L	<210	<210	<21	<0.27	164	146	<44	112	156	<24	<10.5	<1.8	168	<11	<15	17.4
Chloroethane	µg/L	<330	<330	<33	76.6	411	346	<134	354	5370	6970	3760	729	6630	2260	1900	10100
Ethane	µg/L	39	45	41	23	29	17	36	33	5.7	9.4	44	12	8.2	8.6	16	31
Acetone	µg/L	<1890	<1890	<189	3690	536	<115	<460	<56.5	<378	<65	<94.5	<14.8	<14.4	<115	<156	945
Methylene Chloride	µg/L	2400	<200	<20	14.6	122	89	152	<10.5	436	149	<10	31.8	58.7	<18.5	<27	91.8
2-Butanone	µg/L	<1020	<1020	<102	<2.5	<62.5	<860	<3440	<190	<204	<41	<51	<25	<62.5	<860	<250	<76
Toluene	µg/L	<160	<160	<16	31.7	96.5	54.5	<28	76	232	134	103	15.7	140	108	84	85.6
Benzene	µg/L	<140	<140	<14	<0.1	20.6	<8.5	<34	<10.5	<28	<7.0	<7.0	<1	<1.3	<8.5	<8	<4.2
p-Ethyltoluene	µg/L	<240	<240	<24	<0.16	<2.2	<12	<48	<8.0	<48	<17	<12	<1.6	9.9	<12	<12	<3.2
1,3,5-Trimethylbenzene	µg/L	<120	<120	<12	0.63	<1.1	<6.0	<24	<10	<24	<15	<6	<3.4	<1.1	<6.0	<10	<4.0
2-Chlorotoluene	µg/L	<170	<170	<17	5.1	<1.6	<10.5	<42	<12.5	<34	<13.5	<8.5	<2.1	51.5	<10.5	<13.5	<5.0
1,2,4-Trimethylbenzene	µg/L	<130	<130	<13	<0.22	<2.2	<6.5	<26	<8.5	<26	<12.5	<6.5	<2.2	17	<6.5	<8.5	<3.4
Naphthalene	µg/L	<270	<270	<27	<0.19	<4.1	<13.5	<54	<14.5	<54	<9.0	<13.5	<1.9	<4.1	<13.5	<7	<5.8
o-Xylene	µg/L	<80	<80	<8	<0.	<1.4	<8.0	<32	<12.5	<16	<13.5	<4.0	<1.6	<1.6	<8.0	<10	<5.0
n-Propylbenzene	µg/L	<140	<140	<14	<0.21	<3.1	<7.0	<28	<8.0	<28	<14.0	<7.0	<2.1	<3.1	<7.0	<10.5	<3.2
Methyl T-Butyl Ether	µg/L	<250	<250	<25	<0.28	9.0	117	<36	<9.0	<50	<11.5	<12.5	<2.8	<0.80	125	<17	26.6
Sum VOAs (w/o Gases)	µg/L	218600	282800	37370	37579	32207	24113	28262	19530	32164	27402	32281	2479	35231	24941	17751	15176
Methane	mg/L	100	140	44	36	500	1020	2000	5500	390	890	800	930	870	1400	3850	11100
Iron, Total	mg/L	50.6	5.91	69.6	3.92	32.5	5.39	8.46	4.63	60.4	66.8	74.3	20.8	77.5	39.0	35.8	114
Sulfate	mg/L	286	392	154	53.7	1050	1640	3640	119	124	186	137	94.6	173	188	127	185
Nitrate-Nitrogen	mg/L		<0.015	0.53	0.037	<0.015	<0.13	0.009	0.017		0.93	0.35	0.073	0.0030	<0.13	0.029	<0.025
Total Organic Carbon	mg/L	294	432	22.7	48.1	176	34.4	1600	173	98.2	88.6	104	27.8	51.8	29.6	102	349

Table 1 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-4							DMP-4							
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	6/25/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Days		0	48	110	207	313	494	662	0	48	110	207	313	494	578	662
Tetrachloroethene	µg/L	13.2	<5.6	<0.80	<5.5	9.3	32	70.2	<0.40	<0.080	<0.080	<0.11	<2.0	<1.2	<0.48	<0.55
Trichloroethene	µg/L	<0.85	<5.4	<1.7	<10	<1.7	<3.4	6.5	<0.85	<1.70	<0.17	<0.20	<1.7	<1.7	<0.32	<1.8
cis-1,2-Dichloroethene	µg/L	143	<6.8	<1.9	<15	10.8	<3.6	30	<0.95	<1.90	<0.19	<0.30	<1.4	<1.8	<0.42	<1.2
trans-1,2-Dichloroethene	µg/L	<1.35	<5.6	<2.7	<11	<1.4	<5.6	0.62	<1.35	<2.70	<0.27	3.4	<1.4	<2.8	<0.40	<1.55
Vinyl Chloride	µg/L	175	34.6	37.6	72.5	111	126	4.9	<1.75	<3.50	<0.35	2.9	<0.70	<8.5	<0.20	<1.15
Ethene	µg/L	220	190	220	170	160	340	87	250	260	220	160	<6	230	150	200
Acetylene	µg/L						<1.2	<1.2						<1.2	<1.2	<1.2
1,1,1-Trichloroethane	µg/L	3150	246	997	3100	2610	2700	23	56.3	130	<0.11	15.3	18.4	<1.4	<0.44	<1.3
1,1-Dichloroethane	µg/L	4070	1740	1180	2230	3270	2890	135	29.7	20.1	<0.14	50.1	30.0	16.3	38.6	78.1
1,2-Dichloroethane	µg/L	26.2	<3.8	<1.6	<10	19.7	<3.2	<0.46	<0.80	<1.60	<0.16	8.7	<1.3	<1.6	<0.46	6.5
1,1-Dichloroethene	µg/L	105	<9.6	<2.1	<9	48.2	130	<0.54	<1.05	<2.10	<0.21	<0.18	<1.4	<2.2	<0.6	<1.35
Chloroethane	µg/L	1220	827	3000	1590	945	776	147	2420	2580	3300	3680	2680	1210	1260	1330
Ethane	µg/L	<6	<6	39	<10	<10	2.4	12	<6	<6	37	<6	<6	2.4	<1.3	4.7
Acetone	µg/L	<9.4	<26	<18.9	<74	<14.4	<46	365	<9.45	<18.9	<1.89	58.4	<14.4	<23	<6.24	<5.65
Methylene Chloride	µg/L	295	123	<2	278	127	66.8	7.5	22.8	16.6	3.9	19.8	20.8	8.4	12.2	22.2
2-Butanone	µg/L	<5.1	<16.4	<10.2	<125	<62.5	<344	<7.6	<5.1	<10.2	<1.02	<2.5	<62.5	<172	<10	<19
Toluene	µg/L	116	37.6	25.5	<7.5	48.2	69.6	<0.40	11	7.5	3.1	6.1	<1.4	6.9	10.2	7.3
Benzene	µg/L	<0.70	<2.8	<1.4	<5	<1.3	<3.4	<0.42	<0.70	<1.40	<0.14	<0.10	<1.3	<1.7	<0.321	<1.05
p-Ethyltoluene	µg/L	4.8	<6.8	<2.4	<8	<2.2	<4.8	<0.32	3.7	<2.40	<0.24	1.2	<2.2	<2.4	<0.48	<0.80
1,3,5-Trimethylbenzene	µg/L	3.2	<6.0	<1.2	<17	<1.1	<2.4	<0.40	9.2	<1.20	2.5	3.4	<1.1	<1.2	6.9	<1.0
2-Chlorotoluene	µg/L	45.5	<5.4	<1.7	<10.5	21.4	<4.2	<0.50	64.5	44.5	17.1	31.6	31.9	34.2	40.2	21.1
1,2,4-Trimethylbenzene	µg/L	8.6	<5.0	<1.3	<11	<2.2	<2.6	<0.34	18.3	15.9	5.3	<0.22	9.2	9.0	13.5	5.3
Naphthalene	µg/L	<1.35	<3.6	<2.7	<9.5	<4.1	<5.4	<0.58	4.3	<2.70	<0.27	1.6	<4.1	<2.7	<0.28	<1.45
o-Xylene	µg/L	<0.40	<5.4	<0.8	<8	<1.6	<3.2	<0.50	4.8	<0.80	<0.008	5.0	<1.6	<1.6	3.6	<1.25
n-Propylbenzene	µg/L	<0.70	<5.6	<1.4	<10.5	<3.1	<2.8	<0.32	44.3	<1.40	<0.14	<0.21	<3.1	<1.4	<0.42	<0.80
Methyl T-Butyl Ether	µg/L	<1.25	<4.6	<2.5	<14	<0.80	<3.6	<0.36	<1.25	<2.4	<0.25	<0.28	<0.80	21.9	<0.68	<0.90
Sum VOAs (w/o Gases)	µg/L	9376	3008	5240	7271	7221	6790	790	2689	2815	3332	3888	2790	1307	1385	1471
Methane	mg/L	450	470	1100	3650	1800	2600	4120	180	210	190	300	<6	250	240	2480
Iron, Total	mg/L	76.2	38.9	47.1	54.5	41.2	17.8	1010	48.2	39.2	42.5	85.4	116	31.6	29.1	44.1
Sulfate	mg/L	933	470	435	1700	1910	1630	119	133	171	98.5	209	323	146	176	249
Nitrate-Nitrogen	mg/L		<0.015	0.31	0.19	0.037	<0.13	<0.025		0.22	0.31	0.17	<0.015	<0.13	0.051	<0.025
Total Organic Carbon	mg/L	73.6	60.4	<0.94	34.6	46.5	31.0	3440	43.7	52.4	50.9	34.6	35.7	7.1	71.7	161

Table 1 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		MW-8					MW-9			MW-12				
Date		3/28/01	7/12/01	1/8/02	4/3/02	6/26/02	3/28/01	7/12/01	1/8/02	3/28/01	7/12/01	1/9/02	4/3/02	6/26/02
Days		0	106	287	371	455	0	106	287	0	106	287	371	455
Tetrachloroethene	µg/L	<0.11	<0.20	<0.12	<0.24	<0.22	<0.11	<0.20	<0.24	<0.11	<0.20	<0.24	<2.4	<1.1
Trichloroethene	µg/L	1.8	1.7	0.97	<0.16	<0.72	<0.20	<0.17	<0.16	122	0.93	16.5	31	67.8
cis-1,2-Dichloroethene	µg/L	<0.30	1.2	<0.18	<0.21	<0.48	<0.30	<0.14	<0.21	1280	18.2	430	503	467
trans-1,2-Dichloroethene	µg/L	<0.22	<0.14	<0.28	<0.20	<0.62	<0.22	<0.14	<0.20	7.3	<0.14	5.6	<2.0	<2.1
Vinyl Chloride	µg/L	<0.25	<0.070	<0.85	<0.10	<0.46	<0.25	<0.070	<0.10	244	5.7	298	333	151
Ethene	µg/L	<6	<6	<1.3	<1.3	1.2	<6	<6		6.7	69	180	130	190
Acetylene	µg/L			<1.2	<1.2	<1.2							<1.2	<1.2
1,1,1-Trichloroethane	µg/L	<0.20	<0.16	<0.14	<0.22	<0.52	<0.20	<0.16	<0.22	<0.20	<0.16	<0.22	<2.2	<2.6
1,1-Dichloroethane	µg/L	<0.14	<0.12	<0.25	<0.22	<0.60	<0.14	<0.12	<0.22	72.2	3.7	329	684	345
1,2-Dichloroethane	µg/L	<0.20	<0.13	<0.16	<0.23	<0.46	<0.20	<0.13	<0.23	2.9	<0.13	1.4	<2.3	<2.3
1,1-Dichloroethene	µg/L	<0.18	<0.14	<0.22	<0.30	<0.54	<0.18	<0.14	<0.30	8.4	<0.14	2.3	<3	<2.7
Chloroethane	µg/L	<0.30	<0.18	<0.67	<0.61	<0.48	<0.3	<0.18	<0.61	<0.30	<0.18	6.1	<6.1	<2.4
Ethane	µg/L	<6	<6	<1.3	<1.3	<1.3	<6	<6		<6	13	22	11	18
Acetone	µg/L	<1.48	<1.44	<2.3	<3.12	<2.26	<1.48	<1.44	<3.12	<1.48	<1.44	<3.12	<31.2	<1.9
Methylene Chloride	µg/L	<0.41	<0.15	<0.37	<0.54	<0.42	<0.41	<0.15	<0.54	<0.41	<0.15	<0.54	<5.4	<2.1
2-Butanone	µg/L	<2.5	<6.25	<17.2	<5.0	<7.6	<2.5	<6.25	<5.0	<2.5	<6.25	<5.0	<50	<38
Toluene	µg/L	<0.15	<0.14	<0.14	<0.14	<0.40	<0.15	<0.14	<0.14	0.97	<0.14	5.6	11.4	<2.0
Benzene	µg/L	<0.10	<0.13	<0.17	<0.16	<0.42	<0.10	<0.13	<0.16	5.3	<0.13	5.4	<1.6	<2.1
p-Ethyltoluene	µg/L	<0.16	<0.22	<0.24	<0.24	<0.32	<0.16	<0.22	<0.24	<0.16	<0.22	<0.24	<2.4	<1.6
1,3,5-Trimethylbenzene	µg/L	<0.34	<0.11	<0.12	<0.20	<0.40	<0.34	<0.11	<0.20	<0.34	<0.11	<0.20	<2.0	<2.0
2-Chlorotoluene	µg/L	<0.21	<0.16	<0.21	<0.27	<0.50	<0.21	<0.16	<0.27	393	26.9	2690	3660	1940
4-Chlorotoluene	µg/L									14.5	<0.17	82.8	139	147
1,2,4-Trimethylbenzene	µg/L	<0.22	<0.22	<0.13	<0.26	<0.34	<0.22	<0.22	<0.17	<0.22	<0.22	<0.17	<1.7	<1.7
Naphthalene	µg/L	<0.19	<0.41	<0.27	<0.14	<0.58	<0.19	<0.41	<0.14	<0.19	<0.41	<0.14	<1.4	<2.9
o-Xylene	µg/L	<0.16	<0.16	<0.16	<0.20	<0.50	<0.16	<0.16	<0.20	<0.16	<0.16	2.3	<2.0	<2.5
n-Propylbenzene	µg/L	<0.21	<0.31	<0.14	<0.21	<0.32	<0.21	<0.31	<0.21	<0.21	<0.31	<0.21	<2.1	<1.6
Methyl t-Butyl Ether	µg/L	<0.28	<0.080	<0.18	<0.34	<0.36	<0.28	<0.080	<0.34	<0.28	<0.080	<0.34	<3.4	<1.8
Sum VOAs (w/o Gases)	µg/L	1.8	2.9	1.0	0.0	0.0	0.0	0.0	0.0	2151	55	3875	5361	3118
Methane	mg/L	<6	61	9.1	<0.7	20	300	940		420	1800	2170	1670	3470
Iron, Total	mg/L	0.023	0.088	<0.096	<0.096	0.013	10.4	21.9		7.29	55.6	61.0	934	46.7
Sulfate	mg/L	22.6	23.4	27.4	23.2	143	4.43	23.1		417	824	418	1160	100
Nitrate-Nitrogen	mg/L	6.1	5.63	6.93	6.66	6.67	<0.025	<0.015		<0.025	0.070	0.005	0.099	<0.025
Total Organic Carbon	mg/L	4.97	<0.94	<0.94	1.41	6.6	7.98	6.79		33.3	36.6	<0.94	72.6	<0.51

Table 1 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		MW-13				
Date		3/28/01	7/12/01	1/10/02	4/3/02	6/26/02
Days		0	106	288	371	455
Tetrachloroethene	µg/L	82.8	120	216	227	16.2
Trichloroethene	µg/L	85.9	114	216	132	13.9
cis-1,2-Dichloroethene	µg/L	784	897	1950	988	69.6
trans-1,2-Dichloroethene	µg/L	3.6	4.7	11.9	8.0	<0.31
Vinyl Chloride	µg/L	38.6	58.6	112	74	4.6
Ethene	µg/L	<6	<6	1.6	<1.3	1.1
Acetylene	µg/L			<1.2	<1.2	<1.2
1,1,1-Trichloroethane	µg/L	40	36.7	32.2	19.7	1.2
1,1-Dichloroethane	µg/L	323	351	476	305	17
1,2-Dichloroethane	µg/L	2.6	2.3	2.8	<0.23	<0.23
1,1-Dichloroethene	µg/L	60.6	60.4	75.5	43.6	2.8
Chloroethane	µg/L	<0.30	<0.18	<0.61	<0.61	<0.24
Ethane	µg/L	5.8	6.7	23	8.7	2.7
Acetone	µg/L	<1.48	<1.44	18.7	<3.12	<1.13
Methylene Chloride	µg/L	<0.41	<0.15	<0.54	<0.54	<0.21
2-Butanone	µg/L	<2.5	<6.25	<5.0	<5.0	<3.8
Toluene	µg/L	<0.15	<0.14	<0.14	<0.14	<0.20
Benzene	µg/L	7.1	7.1	8.0	4.7	<0.21
p-Ethyltoluene	µg/L	<0.16	<0.22	<0.24	<0.24	<0.16
1,3,5-Trimethylbenzene	µg/L	<0.34	<0.11	<0.20	<0.20	<0.20
2-Chlorotoluene	µg/L	16.3	43.2	76.4	27.8	2.5
4-Chlorotoluene	µg/L					
1,2,4-Trimethylbenzene	µg/L	<0.22	<0.22	<0.17	<0.17	<0.17
Naphthalene	µg/L	<0.19	<0.41	<0.14	<0.14	<0.29
o-Xylene	µg/L	<0.16	<0.16	<0.20	<0.20	<0.25
n-Propylbenzene	µg/L	<0.21	<0.31	<0.21	<0.21	<0.25
Methyl t-Butyl Ether	µg/L	<0.28	<0.080	<0.34	<0.34	<0.18
Sum VOAs (w/o Gases)	µg/L	1445	1695	3196	1830	128
Methane	mg/L	12	21	250	110	140
Iron, Total	mg/L	0.54	0.48	0.93	0.76	0.27
Sulfate	mg/L	597	579	648	366	22.7
Nitrate-Nitrogen	mg/L	3.95	4.68	3.54	4.84	2.15
Total Organic Carbon	mg/L	9.52	13.3	<0.94	15.4	<0.51

Table 2. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	MW-14						MW-7					
Date		8/31/00	10/19/00	12/20/00	3/28/01	7/11/01	1/8/02	8/31/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02
Tetrachloroethene	µM		<0.0084	<0.0024	<0.033	<0.024	<0.014	<0.0024	<0.0034	<0.0024	<0.013	<0.0012	<0.00072
Trichloroethene	µM	<0.0065	<0.010	<0.0065	<0.076	<0.026	<0.026	<0.0065	0.15	<0.0065	<0.030	0.12	0.021
cis-1,2-Dichloroethene	µM	<0.0098	<0.018	<0.0098	<0.15	<0.029	<0.037	0.49	2.9	3.7	1.5	1.9	0.086
trans-1,2-Dichloroethene	µM	<0.014	<0.014	<0.014	<0.11	<0.021	<0.060	<0.014	<0.0058	<0.014	<0.045	0.027	0.022
Vinyl Chloride	µM	<0.028	0.17	<0.028	1.8	2.3	2.8	0.63	1.1	2.2	1.0	1.0	0.17
Ethene	µM	1.5	1.7	2.1	2.3	4.6	3.2	2.3	6.1	3.9	1.2	3.4	3.9
Acetylene	µM						0.22						<0.046
1,1,1-Trichloroethane	µM	0.11	<0.013	0.067	7.5	15	11	<0.0041	<0.046	<0.0041	<0.030	<0.0012	<0.0010
1,1-Dichloroethane	µM	1.3	2.2	3.0	93	190	142	1.2	2.2	2.7	1.4	2.1	1.9
1,2-Dichloroethane	µM	<0.0081	<0.0096	<0.0081	<0.10	0.35	<0.032	<0.0081	<0.0038	<0.0081	<0.040	<0.0013	0.037
1,1-Dichloroethene	µM	<0.011	0.065	<0.011	4.6	7.8	5.6	<0.011	<0.0099	<0.011	<0.037	0.020	<0.0023
Chloroethane	µM	0.24	<0.019	<0.026	2.0	4.6	7.8	4.0	2.8	3.1	2.5	4.2	6.0
Ethane	µM	1.7	2.3	1.6	1.1	2.2	1.6	<0.20	4.3	2.7	1.1	2.4	2.3

Contaminant	Well	SMP-1						DMP-1									
Date		8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02	8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Tetrachloroethene	µM	<0.096	<0.0024	<0.13	<0.033	<0.012	<0.036	<0.091	<0.042	<0.0024	<0.00048	<0.0024	<0.033	<0.0060	<0.0036	<0.0037	0.0066
Trichloroethene	µM	<0.026	0.60	6.5	11.6	0.19	34	202	0.31	<0.0065	<0.0018	<0.0065	<0.076	0.034	<0.0065	0.22	0.080
cis-1,2-Dichloroethene	µM	257	387	311	<0.0028	127	186	439	265	0.52	0.018	0.18	0.76	0.40	<0.0093	0.46	0.64
trans-1,2-Dichloroethene	µM	<0.56	0.72	<0.41	1.4	0.36	0.71	3.9	<0.16	<0.014	<0.0028	<0.014	<0.11	<0.0072	<0.014	0.040	0.029
Vinyl Chloride	µM	75	96	81	76	68	56	28	143	3.0	0.056	0.64	2.0	0.68	<0.068	0.99	0.41
Ethene	µM	33	86	41	32	68	23	29	65	20	39	33	25	3.9	3.3	5.7	7.5
Acetylene	µM						<0.42	0.28	<0.046						<0.046	<0.046	<0.046
1,1,1-Trichloroethane	µM	<0.16	<0.0041	<0.25	2.7	1.2	<0.052	<0.082	<0.097	<0.0041	<0.00082	<0.0041	1.4	0.21	<0.0052	<0.0033	0.0067
1,1-Dichloroethane	µM	5.1	4.9	6.3	7.2	5.4	4.6	3.7	3.0	0.93	0.18	3.6	11	13	4.3	2.4	4.2
1,2-Dichloroethane	µM	<0.32	<0.0081	<0.17	<0.033	<0.033	<0.081	<0.12	<0.12	<0.0081	<0.0016	<0.0081	<0.10	0.15	<0.0081	<0.0046	0.029
1,1-Dichloroethene	µM	<0.43	0.66	<0.27	1.9	0.57	1.5	3.1	0.52	<0.011	<0.0022	<0.011	<0.093	<0.0071	<0.011	<0.0062	<0.0028
Chloroethane	µM	<1.1	1.1	<0.82	<0.23	<0.23	<0.52	<0.47	<0.19	51	0.67	3.6	2.5	3.0	1.5	1.1	0.57
Ethane	µM	<0.20	<0.20	<0.83	<0.83	<0.83	<0.43	<0.43	0.12	<0.20	<0.20	<1.7	<3.3	<1.7	0.027	<0.043	0.060

Table 2 continued. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	SMP-3					DMP-3									
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/23/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Tetrachloroethene	µM	<0.48	<0.48	<0.048	0.083	0.074	<0.036	<0.14	<0.033	<0.097	0.36	<0.024	<0.0066	0.44	0.21	<0.072	<0.013
Trichloroethene	µM	<1.3	<1.3	<0.13	<0.0015	<0.013	<0.065	<0.26	<0.14	<0.26	<0.10	<0.065	<0.015	0.065	<0.065	<0.061	<0.055
cis-1,2-Dichloroethene	µM	<2.0	<2.0	<0.20	0.024	0.17	<0.093	<0.37	<0.12	<0.39	<0.18	<0.098	<0.031	0.15	<0.093	<0.11	<0.050
trans-1,2-Dichloroethene	µM	<2.8	<2.8	<0.28	<0.0023	<0.014	<0.14	<0.58	<0.16	<0.56	<0.14	<0.14	<0.023	<0.014	<0.14	<0.10	<0.064
Vinyl Chloride	µM	<5.6	<5.6	<0.56	0.62	1.6	<0.68	<2.72	1.9	17	15	13	2.3	13	10.5	6.4	1.8
Ethene	µM	3.0	3.5	1.4	0.64	3.9	6.4	7.9	9.3	15	16	11	10	18	12.9	7.9	22
Acetylene	µM						0.081	0.21	0.085						<0.046	<0.046	<0.046
1,1,1-Trichloroethane	µM	1334	1762	244	253	98	109	57	60	148	107	175	5.9	180	146	87	10
1,1-Dichloroethane	µM	386	483	48	<0.0051	178	89	207	109	53	49	42	7.7	33	23	38	24
1,2-Dichloroethane	µM	<1.6	<1.6	<0.16	0.061	0.21	<0.081	<0.32	<0.12	<0.32	<0.096	<0.081	<0.020	0.26	<0.081	<0.112	0.37
1,1-Dichloroethene	µM	<2.2	<2.2	<0.22	<0.0028	1.7	1.5	<0.45	1.2	1.6	<0.25	<0.11	<0.018	1.7	<0.11	<0.15	0.18
Chloroethane	µM	<5.1	<5.1	<0.51	1.2	6.4	5.4	<2.1	5.5	83	108	58	11	103	35	29	157
Ethane	µM	1.3	1.5	1.4	0.77	0.97	0.57	1.2	1.1	0.19	0.31	1.5	0.40	0.27	0.29	0.53	1.0

Contaminant	Well	SMP-4					DMP-4									
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	6/25/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	6/25/02
Tetrachloroethene	µM	0.080	<0.0034	<0.0048	<0.033	0.056	0.193	0.42	<0.0024	<0.00048	<0.00048	<0.00066	<0.012	<0.0072	<0.0029	<0.0033
Trichloroethene	µM	<0.0065	<0.041	<0.013	<0.076	<0.076	<0.076	0.049	<0.0065	<0.013	<0.013	<0.0015	<0.013	<0.013	<0.0024	<0.14
cis-1,2-Dichloroethene	µM	1.5	<0.070	<0.0020	<0.15	0.11	<0.026	0.31	<0.0098	<0.020	<0.0020	<0.0031	<0.014	<0.019	<0.0043	<0.012
trans-1,2-Dichloroethene	µM	<0.014	<0.058	<0.0028	<0.11	<0.014	<0.058	<0.0064	<0.014	<0.028	<0.0028	0.035	<0.014	<0.029	<0.0041	<0.016
Vinyl Chloride	µM	2.8	0.55	0.60	1.2	1.8	2.0	0.078	<0.028	<0.056	<0.0056	0.046	<0.011	<0.14	<0.0032	<0.018
Ethene	µM	7.9	6.8	7.9	6.1	5.7	12	3.1	8.9	9.3	7.9	5.7	<0.21	8.2	5.4	7.1
Acetylene	µM						<0.046	<0.046						<0.046	<0.046	<0.046
1,1,1-Trichloroethane	µM	24	1.8	7.5	23	20	20	0.17	0.42	0.97	<0.00082	0.11	0.14	<0.010	<0.0033	<0.0097
1,1-Dichloroethane	µM	41	18	12	23	33	29	1.4	0.30	0.20	<0.0014	0.51	0.30	0.16	0.39	0.79
1,2-Dichloroethane	µM	0.26	<0.038	<0.016	<0.10	0.20	<0.032	<0.0046	<0.0081	<0.016	<0.0016	0.088	<0.013	<0.016	<0.0046	0.066
1,1-Dichloroethene	µM	1.1	<0.099	<0.022	<0.093	0.50	1.3	<0.0056	<0.011	<0.022	<0.0022	<0.0019	<0.014	<0.022	<0.062	<0.014
Chloroethane	µM	19	13	47	25	15	12	2.3	38	40	51	57	42	19	20	21
Ethane	µM	<0.20	<0.20	1.3	<0.33	<0.33	0.080	0.40	<0.20	<0.20	1.2	<0.20	<0.20	0.080	<0.043	0.16

Table 2 continued. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	MW-8					MW-9			MW-12				
Date		3/28/01	7/12/01	1/8/02	4/3/02	6/25/02	3/28/01	7/12/01	1/8/02	3/28/01	7/12/01	1/9/02	4/3/02	6/26/02
Tetrachloroethene	µM	<0.00066	<0.0012	<0.00072	<0.0014	<0.0013	<0.00066	<0.0012	<0.0014	<0.00066	<0.0012	<0.0144	<0.014	<0.0066
Trichloroethene	µM	0.014	0.013	0.0074	<0.0012	<0.0055	<0.0015	<0.0013	<0.0012	0.93	0.0071	0.13	0.24	0.52
cis-1,2-Dichloroethene	µM	<0.0031	0.012	<0.0019	<0.022	<0.0050	<0.0031	<0.014	<0.0022	13	0.19	4.4	5.2	4.8
trans-1,2-Dichloroethene	µM	<0.0022	<0.0014	<0.0029	<0.0021	<0.0064	<0.0022	<0.0014	<0.0021	0.075	<0.0014	0.058	<0.021	<0.032
Vinyl Chloride	µM	<0.0040	<0.0011	<0.014	<0.0016	<0.0074	<0.0040	<0.0011	<0.0016	3.9	0.091	4.8	5.3	2.4
Ethene	µM	<0.21	<0.21	<0.046	<0.046	0.043	<0.21	<0.21		0.24	2.5	6.4	4.6	6.8
Acetylene	µM			<0.046	<0.046	<0.046						<0.046	<0.046	<0.046
1,1,1-Trichloroethane	µM	<0.0015	<0.0012	<0.0010	<0.0016	<0.0039	<0.0015	<0.0012	<0.0016	<0.0015	<0.0012	<0.0016	<0.016	<0.019
1,1-Dichloroethane	µM	<0.0014	<0.0012	<0.0025	<0.0022	<0.0062	<0.0014	<0.0012	<0.0023	0.73	0.037	3.3	6.9	3.5
1,2-Dichloroethane	µM	<0.0020	<0.0013	<0.0016	<0.0023	<0.0046	<0.0020	<0.0013	<0.0023	0.029	<0.0013	0.014	<0.023	<0.023
1,1-Dichloroethene	µM	<0.0019	<0.0014	<0.0023	<0.0030	<0.0056	<0.0019	<0.0014	<0.0030	0.087	<0.0014	0.024	<0.0031	<0.011
Chloroethane	µM	<0.0047	<0.0028	<0.010	<0.0095	<0.0074	<0.0047	<0.0028	<0.0095	<0.0047	<0.0047	0.095	<0.095	<0.037
Ethane	µM	<0.20	<0.20	<0.043	<0.043	<0.043	<0.20	<0.20		<0.20	0.43	0.73	0.37	0.60

Contaminant	Well	MW-13				
Date		3/28/01	7/12/01	1/10/02	4/3/02	6/26/02
Tetrachloroethene	µM	0.50	0.72	1.3	1.4	0.10
Trichloroethene	µM	0.65	0.87	1.6	1.0	0.11
cis-1,2-Dichloroethene	µM	8.1	9.3	20	10	0.72
trans-1,2-Dichloroethene	µM	0.037	0.049	0.123	0.083	<0.0032
Vinyl Chloride	µM	0.62	0.94	1.8	1.2	0.074
Ethene	µM	<0.21	<0.21	0.057	<0.046	0.039
Acetylene	µM			<0.046	<0.046	<0.046
1,1,1-Trichloroethane	µM	0.30	0.28	0.24	0.15	0.0090
1,1-Dichloroethane	µM	3.3	3.5	4.8	3.1	0.17
1,2-Dichloroethane	µM	0.026	0.023	0.028	<0.002	<0.0023
1,1-Dichloroethene	µM	0.63	0.62	0.78	0.45	0.029
Chloroethane	µM	<0.0047	<0.0025	<0.0095	<0.0095	<0.0037
Ethane	µM	0.19	0.22	0.77	0.29	0.090

Table 3. Photocircuits Anaerobic Pilot Field Data

Well		MW-7		SMP-1			DMP-1			SMP-3		
Well Depth	ft	23.2		9.1			19.04			14.6		
Well Diameter	inch	4		1			1			1		
Date		1/8/02	4/2/02	1/8/02	4/2/02	6/25/02	1/8/02	4/2/02	6/25/02	1/8/02	4/2/02	6/25/02
Water Level	ft	7.12		6.42			6.88			6.8		
pH		7.36	7.1	7.48	7.3	7.5	7.29		7.3	9.94	8.7	8.8
Temperature	°C	17.9	16.81	11.64	14.84	18.74	17.85		17.7	12.06	11.47	19.18
Spec. Conductivity	µmhos/cm	4235	4100	2660	5250	3468	5560		3597	5550	5640	5890
Redox Potential	mV	-53	-40	31	-130	-84	-142		-154	-44	-52	-95
Dissolved Oxygen	mg/L	0.36	0.45	2.27	1.72	5.37	1.98		2.55	3.87	2.94	1.16
Bromide	mg/L				20	39		311	977		5	55

Well		DMP-3			SMP-4			DMP-4		
Well Depth	ft	24.35			15.82			20.55		
Well Diameter	inch	1			1			1		
Date		1/8/02	4/2/02	6/25/02	1/8/02	4/2/02	6/25/02	1/8/02	4/2/02	6/25/02
Water Level	ft	6.91			6.82			6.71		
pH		6.91	7.1	6.3	7.62	7.5	5.26	7.07	7.1	6.7
Temperature	°C	17.95	16.14	16.94	16.54	14.82	18.77	17.64	16.2	17.2
Spec. Conductivity	µmhos/cm	3200	3120	3929	5186	5130	4440	2716	3140	2853
Redox Potential	mV	-120	-110	-146	-165	-170	-25	-121	-80	-176
Dissolved Oxygen	mg/L	1.57	1.43	0.21	0.73	0.65	7.5	0.41	0.72	0.58
Bromide	mg/L		16	179			336		38	19

Well		MW-8			MW-9	MW-12		MW-13	
Well Depth	ft	>102							
Well Diameter	inch	4							
Date		1/8/02	4/2/02	6/25/02	4/2/02	4/2/02	6/25/02	4/2/02	6/25/02
Water Level	ft	7.96							
pH		8.65	8.4	6.43	7.1	6.5	6.63	6.2	6.56
Temperature	°C	15.43	14.87	12.89	14.26	14.2	14.6	16.9	16.00
Spec. Conductivity	µmhos/cm	183	190	221	200	4120	4680	1520	960
Redox Potential	mV	240	270	273	250	-30	-136	300	279
Dissolved Oxygen	mg/L	8.78	5.32	4.62	0.92	0.7	0.38	1.21	0.48
Bromide	mg/L		5.8	2.0		11	4.1	7.4	0.6

Table 4. Photocircuits Anaerobic Pilot Percent Change Between 9/1/00 and 1/8/02 or 6/25/02

Compound	MW-14	MW-7	SMP-1	DMP-1	SMP-3	DMP-3	SMP-4	DMP-4
Last Sampling Point	1/8/02	1/8/02	6/25/02	6/25/02	6/25/02	6/25/02	6/25/02	6/25/02
Acetone	-908			99		>-150	>-3783	
Methylene Chloride	-787	38	>98	98	100	79	97	3
Toluene	-733	85	>-256	98	>53	63	>100	36
2-Chlorotoluene		>-888		-27			>99	67
Sum VOAs (w/o gases)	-4529	-33	-15	95	91	53	92	45
Methane	-18195	-665	44	94	-5400	-2746	-816	-1278
Iron	-405	-490	43	92	91	-89	-1225	9
Sulfate	92	-813	39	98	58	-49	87	-87
TOC	89	96	-36	92	41	-255	-4574	-268
PCE				>-175			-432	
TCE		>-218	>-21	>-1135			>-665	
cDCE		82	-3	-23			79	
tDCE		>-56		>-107			>54	
VC	>-9786	73	-89	86	>66	89	97	
Ethene	-109	-75	-96	63	-210	-44	60	20
1TCA	-10456			>-62	95	93	99	>98
1DCA	-11090	-58	42	-349	72	54	97	-163
1DCE	>-51519		>-20		47	89	99	
CA	-3112	-51		99	-7	-88	88	45
Ethane	6	>-1033	40	>70	15	-444	>-100	>22

Table 5. Photocircuits Downgradient Wells Percent Change Between 3/28/00 and 1/8/02 or 6/25/02

Compound	MW-8	MW-9	MW-12	MW-13
Last Sampling Point	6/26/02	1/8/02	6/26/02	6/26/02
Acetone				
Methylene Chloride				
Toluene			>-106	
2-Chlorotoluene			-394	85
Sum VOAs (w/o gases)	100		-46	91
Methane	-233		-726	-1067
Iron	43		-541	50
Sulfate	-533		76	96
TOC	-33		98	95
PCE				80
TCE			44	84
cDCE			64	91
tDCE			>71	>91
VC			38	88
Ethene	>80		-2736	>82
1TCA				97
1DCA			-378	95
1DCE			>68	95
CA				
Ethane			>-200	53

Table 6. Summary of Changes in Concentrations of Chloroethenes, Chloroethanes, Electron Acceptors, and Electron Donor by Well

Well	Chlorinated Ethene Dechlorination	Chlorinated Ethane Dechlorination	Electron Acceptors	Electron Donor Availability
MW-14	Ethene predominant, VC increasing since March 2001. Not sampled 4/02 or 6/02 because of emulsion.	1TCA, 1DCA, 1DCE, and CA, increased between December 2000 and January 2002 as contaminated water displaced by emulsion moved back into well, ethane fairly stable.	Sulfate decreased by 92%, methane and iron up greatly.	TOC availability good. Emulsion found 4/02 and 6/02.
MW-7	Ethene generally predominant product, TCE up slightly. cDCE and VC down by 82 and 73% from start of pilot. tDCE up slightly. Not sampled 4/02 or 6/02 because of emulsion.	1DCA and CA up, CA major product. Ethane produced. Not sampled 4/02 or 6/02 because of emulsion.	Sulfate increased from 69 to 949 mg/L from 7/11/01 to 1/8/02, methane and iron up greatly.	TOC had fallen to 1.7 mg/L in 1/02. Emulsion found 4/02 and 6/02.
SMP-1	TCE and cDCE up beginning in January 2002, but fell between April and June 2002 as VC and ethene increased as more substrate became available.	No 1TCA detected 6/25/02, 1DCA down. 1DCE up >20%. Little CA or ethane.	Sulfate down 39% from start of pilot; sulfate levels decreasing with higher substrate. Methane and iron down from start of pilot.	TOC rebounded to 125 mg/L in 6/02; enhanced dechlorination.
DMP-1	PCE, TCE, cDCE, and tDCE up slightly in 6/02, VC decreased by 86% as of 6/25/02, ethene predominant product, but lower since December 2000.	1TCA up >62%, 1DCA up 349%, CA down by 98%, little ethane detected.	Sulfate down 98%, methane and iron also down.	TOC dropped to 24 mg/L in 6/02, below optimal levels.
SMP-3	PCE, cDCE, and tDCE non-detect in June 2002, VC detected ethene predominant product and increasing.	1TCA down by 95%, 1DCA down 72%, 1DCE down by 47, increasing CA, and some ethane.	Sulfate decreased from 3,640 mg/L in April 2002 to 119 mg/L in June 2002, methane increasing, and iron variable.	TOC in April 2002 up to 1,600 mg/L; adequate levels in June 2002 (173 mg/L)
DMP-3	PCE, TCE, cDCE, and tDCE not detected 6/25/02. VC down 89%, ethene major product and increasing.	1TCA down by 93%, 1DCA down 72%, and 1DCE down by 47%. CA increased by 7%. Ethane increasing.	Sulfate stable, methane and iron increasing.	TOC increased to 349 mg/L in 6/02.
SMP-4	PCE and TCE up slightly, cDCE, tDCE, and VC down, ethene decreased, but still predominant.	1TCA, 1DCA, 1DCE, and CA down, but little ethane.	Sulfate decreased by 87%, methane, and iron increasing.	TOC of 3,440 found on 6/25/02.
DMP-4	No CE except ethene.	1TCA down >98, 1DCA up 163%, 1DCE non-detect 6/25/02. CA predominant product, but decreasing, little ethane.	Sulfate up 32%, iron down, and methane increased.	TOC increased to 161mg/L in June 2002, adequate levels.

Table 6 continued. Summary of Changes in Concentrations of Chloroethenes, Chloroethanes, Electron Acceptors, and Electron Donor by Well

Well	Chlorinated Ethene Dechlorination	Chlorinated Ethane Dechlorination	Electron Acceptors	Electron Donor Availability
MW-8	PCE, TCE, cDCE, and not detected 6/02, low level of ethene. .	No chlorinated ethanes or ethane detected.	Little sulfate, iron, or methane.	Little TOC available.
MW-9	No chlorinated ethenes or ethene detected in January 2002.	No chlorinated ethanes or ethane detected.	Low sulfate, some methane and iron.	Little TOC available.
MW-12	TCE, cDCE, tDCE, and VC decreasing, ethene increasing	1DCA increasing, 1DCA, 1DCE, and CA not detected, ethane detected.	Sulfate and iron decreased, methane increased.	TOC level fell to <0.51 mg/L in June 2002; inadequate levels. .
MW-13	Decreases in PCE, TCE, cDCE, tDCE, and VC concentrations, trace ethene.	Decreases in 1TCA (97%), 1DCA (95%), 1DCE (95%), and ethane (53%) concentrations.	Methane increased, iron stable, and sulfate down 96%.	TOC level of <0.51 mg/L in June 2002, below optimal.

JUNE 2002
STATUS REPORT
PHOTOCIRCUITS ACCELERATED ANAEROBIC BIOREMEDIATION PILOT

PREPARED FOR:

PHOTOCIRCUITS CORPORATION
31 SEA CLIFF AVENUE
GLEN COVE, NY 11542

PREPARED BY:

TERRA SYSTEMS, INC.
1035 PHILADELPHIA PIKE
SUITE E
WILMINGTON DE 19809

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1.0 EXECUTIVE SUMMARY

In August 2000, Photocircuits Corporation initiated a pilot study at its 31 Sea Cliff Ave. property to treat chlorinated volatile organic compounds (VOC) using in situ anaerobic bioremediation. The site is characterized by VOC contamination of a sandy, silt, and gravel aquifer. Monitoring data indicate that some biodegradation of these contaminants was occurring at the site prior to the start of the pilot study. The two primary objectives of this pilot study are to 1) evaluate the use of substrate injection to enhance in situ anaerobic biological degradation of chlorinated VOCs in the study area and 2) obtain operating and performance data to optimize the design and operation of a full-scale system. During the operational period of this pilot study, there is no emphasis on reducing any contaminants to a specific regulatory level.

The study area, which encompasses a triangular area roughly 92 feet wide, 157 feet long, and 60 feet deep, underlies the former drum storage area of the Photocircuits Corporation facility. Prior to the start of the pilot test, total chlorinated contaminant concentrations in wells within the pilot area ranged from 457 to 539,000 µg/L. The initial pilot bioremediation system consisted of six injection points in a line spaced about 15 to 20 feet apart. An edible oil substrate (EOS) package was designed to provide a slow release food grade carbon source over a period in excess of twelve months. The substrate concentrations were selected based on previous experience. An additional 5,722 gallons of substrate was injected in months 17 and 19 at twelve injection points. VOC and substrate concentrations have been monitored seven times over a 19 month period at eight wells spaced throughout the treatment area. VOC and substrate concentrations have also been monitored at four wells downgradient of the treatment area to determine if the substrate has migrated outside of the area and if the substrate amendment has affected these wells.

The system has been operating since August 31, 2000. Substrate monitoring data indicated that substrate was delivered throughout the treatment area with the highest substrate levels found in well MW-14. In the initial injection event in August 2000, the emulsion moved into this well from several of the injection points and displaced much of the contaminated groundwater within this well. Wells MW-14, MW-7, and SMP-4 contained the emulsion in April 2002 and were not sampled. Contaminant levels have increased in MW-14 and MW-7 between August 2000 and January 2002 when the last samples were collected from these wells. An increase in total VOCs has also been observed in SMP-1. Desorption of contaminants adsorbed to the soil due to enhanced biological activity may be contributing to the increased contaminant concentrations in MW-14, MW-7, and SMP-1. Contaminants that partitioned into the injected oil may also be released. Where substrate levels were above 50 mg/L, significant declines in total VOC concentrations (45-96%) were generally observed. Degradation rates for the total VOCs (9/1/01 concentration minus 4/2/02 divided by 584 days) were as high as 329 µg/L-day (well SMP-3) in higher concentration areas with greater than 100,000 µg/L total volatiles. In other areas with lower concentrations, total VOC degradation rates were lower, in the range of 2.3 (DMP-4) to 29 µg/L-day (DMP-3). The average total contaminant concentrations within the pilot cell have fallen by 52% since September 2000. This average includes the wells sampled on 4/2/02 and the three wells last sampled on 1/8/02. The recent substrate reinjection increased the TOC concentrations in all wells within the pilot. About 2,200 gallons of emulsion was injected upgradient of the monitoring wells where it should provide a continuous source of organic carbon.

2.0 INTRODUCTION

The enclosed report describes the field pilot study of *in situ* anaerobic bioremediation of a chlorinated solvent plume at the Photocircuits Corporation's 31 Sea Cliff Avenue, Glen Cove, NY facility. The study, which was initiated on August 31, 2000, has the following objectives:

- Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.
- Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.
- Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.
- Determine what role bioremediation technology has in the overall remediation strategy for the site.

There have been seven groundwater sampling events during the course of the study. As of April 2002, the average total volatile contaminant concentrations within the pilot have decreased by 52%.

During the treatment period of 19 months, we have successfully demonstrated that the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at this site as indicated by the following observations:

- Total contaminant concentrations have decreased by an average 52%.
- The parent compound 1,1,1-trichloroethane has decreased by an average of 88%
- Three monitoring wells (MW-7, MW-14, and SMP-1) have shown increased total volatile concentrations since September 1, 2000 by 33 to 4,529%. Wells MW-7 and MW-14 could not be sampled in April 2002 due the presence of emulsion and the percent change calculations are from September 2000 to January 2002. However, when viewed over the last 13 years, the total VOC concentrations in MW-7 have decreased 96%. From 11/1/99 to 1/8/02, total VOC concentrations have decreased by 44% in MW-14. Since 11/1/99, well SMP-1 has shown an increase in total VOC concentrations of 15,679%. TCE and cDCE concentrations increased sharply between 1/8/02 and 4/2/02 in SMP-1.

It is difficult to determine the total contaminant mass present at this site because of the limited number of soil samples and limited definition of the vertical distribution of this contamination. The total contaminant mass was estimated to be approximately 1,195 pounds based upon the average soil concentrations found in the 1996 or earlier soil borings and a contaminated volume of 361,100 ft^3 (a triangular area 92 feet by 157 feet with a contaminated interval below the water table from 10 to 60 feet below ground surface).

Please note that the goal of this study has been to gather sufficient data to determine the rate and extent of chlorinated solvent biodegradation. If the study area could be isolated such that the contaminant mass did not receive any additional contaminants, Terra Systems, Inc. estimates that based upon the current degradation rates that approximately 90% of the total contaminant mass

can be removed in 46 months. Although an acceptable remediation end point has not been defined for this site, the data suggests that this reduction will be environmentally acceptable since it significantly reduces the probability that chlorinated solvents will migrate off-site.

3.0 BACKGROUND

The Photocircuits Corporation's 31 Sea Cliff Avenue facility, Glen Cove, New York is located on the north shore of Long Island. The plant site is bordered on the north by a light industrial area, to the south and east are arterial roads, and to the west by railroad tracks. The site is generally flat and is covered by manufacturing buildings and parking lots.

3.1 Site Geology/Hydrology

Based on analysis of soil borings and details of well construction at the Photocircuits site, the surficial deposit below the facility is primarily composed of interbedded sand, silt, gravel, and clay layers.

3.2 Nature and Extent of Contamination

The groundwater at the facility has been impacted by chlorinated ethene and chlorinated ethane compounds from various sources. Prior to the start of the pilot test, total volatile organic contaminant concentrations (TVOC) in groundwater ranged from 457 to 539,000 µg/L. Generally, the contamination extends to approximately 90 below ground surface (bgs) with the highest concentrations in the 20 to 50 ft. bgs zone.

3.3 Rationale for Use of Technology

Photocircuits Corporation has been conducting a technology review to determine which remediation technology or technology treatment train will be most appropriate for this facility. Conventional pump-and-treat technologies have been excluded from this review since these technologies have limited applications for aquifer and groundwater restoration (Beeman et al 1993). Other technologies considered have been discussed in other reports submitted to the NYDEC.

Many of the currently utilized cleanup methods for chlorinated solvents employ physical processes that tend to transfer the compounds to another medium. Biological decomposition is one approach that has the potential for destroying hazardous chemicals so that they are rendered harmless for all time.

Semprini et al (1992) outlined the processes affecting movement and fate of halogenated aliphatics as:

1. Advection, the miscible transport in aqueous solution under the influence of the hydraulic potential gradient;
2. Dispersion, the mixing and spreading of concentration fronts, that arises largely from differential rates of movement along the myriad individual flow paths through the porous medium;
3. Sorption, the partitioning of a compound between the moving solution and the stationary solid phase;

4. Immiscible transport, the migration of slightly soluble chemicals as a separate liquid phase, often driven downward by density difference in the case of halogenated aliphatics; and
5. Diffusional transport, the slow migration of solute molecules into the matrix rock or dead-end pores under the influence of a concentration driving force.

Given the heterogeneity of the site and the lack of definitive knowledge of the amount of chlorinated solvents in the impacted area, a technology that can remove a significant amount of the solvents and continue to treat the remaining material is required. While physical technologies such as "pump-and-treat" systems can generally contain a contaminant plume and remove a limited amount of material, it has not been conclusively demonstrated that these technologies can remove a significant amount of the solvents. The USEPA (1996) has stated that

> "The general failure of the pump-and-treat approach was identified as its inability to achieve restoration (i.e., reduction of contaminants to levels required by health-based standards) in 5 to 10 years, as anticipated in the design phase of projects. Although a variety of factors contributed to this shortcoming, tailing and rebound (Section 4) represented the major barrier to achieving remediation goals."

Chemical technologies such as chemical oxidation have promise for removal of a significant portion of the contamination but have not been demonstrated to provide treatment for all of the solvents. For example, 1,1,1-Trichloroethane is resistant to potassium permanganate treatment (ITRC 2000). The chemical oxidants react rapidly with the contaminants and reduced minerals in the soil and do not provide a continuing impact on the contaminants.

As part of the technology review program, Photocircuits Corporation engaged Terra Systems, Inc. (TSI) to conduct an anaerobic bioremediation field pilot study at the facility. The study, which encompasses a triangular area roughly 92 feet wide and 157 long that had been used for drum storage, commenced in August-September, 2000. Eight monitoring points (MW-14, MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, and DMP-4) are being utilized to track the progress of the pilot study. Beginning in March 2001, groundwater samples were also collected from 4 additional wells (MW-8, MW-9, MW-12, and MW-13) to determine if any of the injected substrate had migrated away from the study area. It should be noted that these wells are not expected to be impacted by the bioremediation study. The locations of these wells are shown in Figure 1 with the exception of MW-9 that is further to the west.

Historical data indicates that anaerobic biodegradation is occurring at the site as evidenced by the presence of daughter products from the breakdown of tetrachloroethene (PCE) and trichloroethene (TCE) including cis-1,2-dichloroethene (cDCE), vinyl chloride (VC), and ethene. Acetylene can be produced by the abiotic reaction of PCE or TCE with ferrous sulfide (Butler and Hayes 2000). 1,1,1-Trichloroethane (1TCA) breaks down to 1,1-dichloroethene (1DCE), trans-1,2-dichloroethene (tDCE), 1,1-dichloroethane (1DCA), chloroethane (CA), and ethane. However, VC and ethene can also be generated from the breakdown of the 1TCA, 1DCA, and 1DCE. Based on a review of the site historical data, it appears that the biological degradation process is limited by the availability of organic carbon.

3.4 Technology Description

Anaerobic bioremediation, also referred to as reductive dechlorination, of chlorinated solvents is a well documented process that converts chlorinated ethenes and ethanes to innocuous gases.

The following technology description is from a report entitled "Cost and Performance Report – In Situ Anaerobic Bioremediation Pinellas Northeast Site Largo, Florida" prepared for the U.S. Department of Energy (1998) by Sandia National Laboratories and Hazardous Waste Remedial Actions Program.

Bacteria metabolize soluble organic and inorganic compounds to provide energy for the growth and maintenance of bacterial cells. The complex organic molecules that bacteria consume are converted to new cells and various simpler compounds, such as carbon dioxide, that are released back into the environment. This process is referred to as biodegradation. Biodegradation has been used very cost effectively for more than a century in public and industrial wastewater treatment systems. Since bacteria occur naturally in both soil and ground water environments, bioremediation technologies attempt to stimulate the activity of these naturally occurring (or introduced bacteria) to degrade contaminants in a cost-effective manner. Bioremediation is being considered more often as the processes that control the biological degradation of contaminants in soil and ground water become better understood.

In order to produce new bacterial cells, bacteria require carbon, nitrogen, phosphorus, and energy sources, as well as a number of trace minerals. Electrons are released by the biochemical reactions that metabolize complex organic compounds for energy. Biological systems capture this biochemical energy through a series of electron transfer (redox) reactions. The bacteria that are most commonly used in bioremediation systems use organic compounds as their source of carbon and energy; these carbon compounds are referred to as electron donors. Bacterial respiration requires that some chemical compound is available to act as a terminal electron acceptor. Common electron acceptors used by bacteria include oxygen, nitrate, sulfate, Fe^{3+}, and carbon dioxide.

Recently, a class of anaerobic bacteria has been identified that uses halogenated organic compounds as their electron acceptors. The chlorinated VOCs present in the soil and ground water at the Northeast site are among the halogenated organic compounds that can be used in this manner. Halogenated compounds have a high oxidation state; and when a halogen (e.g. chlorine) is chemically replaced by hydrogen, the oxidation state of the chemical is reduced. This process is referred to as reductive dehalogenation, and it forms the basis of the anaerobic process used by the in situ bacteria at the Northeast site. Under anaerobic conditions, chlorinated compounds can be degraded via reductive dehalogenation reactions to successively lower chlorinated degradation products, and finally to compounds of significantly lower toxicity. This process is illustrated for PCE below.

PCE TCE DCE VC ethene, ethane
step 1 step 2 step 3 step 4

Biological activity is frequently limited by the availability of a single growth factor (e.g. electron acceptor, electron donor, nitrogen, etc.) and supplying the proper growth factor can often

stimulate bacterial growth and biodegradation rates. For in situ bioremediation applications, nutrients or electron acceptors are often injected into the contaminated area to enhance the existing microbial degradation processes. Effectively delivering nutrients requires that factors such as site permeability and geochemistry be considered. Each class of contaminant varies in its susceptibility to biodegradation and factors such as aquifer oxidation-reduction potential, microbial ecology, and contaminant toxicity will affect the success of bioremediation at a site. The effective application of in situ bioremediation therefore depends upon careful consideration of the geologic and hydrologic properties at the site and on the type and concentration of contaminants to be treated.

Evaluations of the monitoring data from the Northeast Site suggested that microbial dechlorination is occurring naturally. cDCE and vinyl chloride (VC) are degradation products of TCE that were measured in high concentrations, but were not contaminants originally disposed of at the site, which suggests that a population of dechlorinating microorganisms is relatively active at Pinellas.

The report continues on to outline the technology advantages and disadvantages which are listed below:

Technology Advantages

- Contaminants are treated in situ with little waste generation
- Contaminant degradation can be relatively fast
- Bioremediation is capable of reducing contaminants to very low levels
- The process stimulates a microbial population that can continue to feed off the dissolved phase of a continuing source after nutrient injection ceases, and
- Often provides a low overall remediation cost relative to other technologies.

Technology Disadvantages

- Contaminant degradation enhancement is dependent on adequate nutrient delivery to all areas of contamination before the nutrients are directly metabolized, which often is primarily a function of site hydrogeology and the appropriate mixing of nutrients, contaminants, and active microbes,
- Site conditions (e.g. soil and ground water chemistry, reductive processes, etc.) must be conducive to the stimulation of biological activity to be effective,
- Bioremediation will not directly degrade contaminants occurring in an immiscible phase,
- High concentrations of contaminants often are toxic to microorganisms,
- Bioremediation may be difficult to optimize at sites with multiple contaminants of concern,
- Incomplete biodegradation of contaminants can lead to the generation of degradation products that are just as toxic or even more so than the parent contaminants, and
- Regulatory concerns over chemical injections into aquifers.

4.0 MATERIALS AND METHODS

4.1 Study Area

The study area encompasses a triangular area roughly 92 feet by 157 feet with a contaminated interval of 50 feet (from the water table at 10 feet to 60 feet) underlies the former drum storage area of the Photocircuits Corporation 31 Sea Cliff Ave, Glen Cove, NY facility. Eight monitoring points (MW-14, MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, and DMP-4) are being utilized to track the progress of the pilot study. Beginning in March 2001 groundwater samples were also collected from four additional wells (MW-8, MW-9, MW-12, and MW-13) to determine if the injected substrate had migrated away from the study area. It should be noted that these wells are not expected to be impacted by the bioremediation study.

4.2 Technical Challenges

The key technical challenges for this study are:

a. ability to move a carbon source throughout the contaminated area;
b. estimation of quantity of chlorinated compounds
c. determination of minimum level of TOC required to optimize reductive dechlorination

4.3 Key Design Criteria

The in situ anaerobic bioremediation pilot system was designed for two main objectives;

- develop a nutrient delivery system capable of providing a mixture of nutrients to the subsurface within the heterogeneous aquifer, such that the nutrients will be delivered to all levels in the treatment area within an approximately 24 month operating period, and
- deliver a sufficient quantity of substrate to the treatment area to last for approximately 24 months.

4.4 Treatment System Schematic and Operation

Figure 2 is a schematic of the pilot anaerobic biotreatment system showing the monitoring wells and the injection locations within the treatment cell. Injection points 1 to 7 were used in the first injection event. In this injection event, the nutrients were distributed throughout the vertical extent of the treatment area by a Geoprobe® rig at the beginning of the pilot. The Geoprobe® pushed a drivepoint to about 50 feet bgs. The drill rod was pulled back two feet to inject the fluids under pressure with a Rupe pump. The rod was then withdrawn four feet and additional fluid was injected. This process continued until about 22 ft bgs. Approximately 3,500 gallons of soybean oil emulsion containing soybean oil, soybean lecithin, and tap water (treated to remove chlorine) was injected into five points. Forty gallons of soybean oil was injected at an additional point. In addition to pressure injection of the emulsion followed by injection of chase water to disperse the nutrients, natural groundwater flow has dispersed the substrate.

During the period of February 25, 2002 to March 3, 2002, Terra Systems, Inc. constructed and utilized a low pressure injection system to inject substrate into the pilot area with twelve

injection wells (injection points 8-19). The injection system consisted of 7 one-inch wells installed to 60 ft. below land surface (bls) and 5 one-inch wells installed to 55 ft. bls. Eight of the wells were spaced 7.5 feet apart in a line. Two additional wells were placed on either side of the line. All of the wells had 20 ft. of PVC blank riser and 40 and 35 ft. of PVC screen (0.02 slot) respectively. The wells were installed using the Geoprobe™ direct-push method.

Injection well installation began on February 25, 2002 using a Geoprobe™ Model 5400 mounted on a small track vehicle. After the installation of well IW-15, the driller was unable to advance the 2-1/2 inch drill rod beyond 15 feet below land surface (bls) in two additional borings. We decided to try a heavier truck mounted Geoprobe™ Model 5400 on February 26, 2002. Four attempts were made on February 26th to install additional wells with the 2-1/2 inch drill rods. The driller encountered refusal at 15 feet bls on two holes and 24 feet bls on two holes. A large truck mounted Geoprobe™ Model 6600 was brought in on February 27, 2002. The driller hit refusal at 35 feet bls in the first borehole using the 2-1/2 inch drill rod. A pilot hole was drilled with a 1-1/2 inch drill rod and then enlarged the boring with the 2-1/2 inch drill rod. The remaining 10 wells were installed using this technique.

The substrate package for this injection event was designed for an estimated five year supply of substrate included 15,704 pounds of soybean oil and surfactant, 150 pounds of quick release substrate, and 10.2 pounds of sodium bromide as tracer. The emulsion was prepared by passing the slow release substrate package, quick release substrate package, and bromide tracer through a high shear mixer. Four 550-gallon stainless steel tanks were used to store the emulsion prior to injection. Approximately 5,058 gallons of the emulsion was prepared and injected during the week of February 25, 2002 (see Table 1).

An additional 719 gallons of the slow release substrate package, quick release substrate package, and bromide tracer was prepared and run through a high shear mixer. The emulsion was stored in 55-gallon drums.

The following observations and conclusions are a result of the reinjection activities:

a. The heterogeneity of the formation makes it difficult to predict which areas will accept large quantities of fluids.
b. The low pressure injection technique did not require chase water to be injected into the formation to push the emulsion away from the injection point at this site.
c. The hydraulic conductivity of the area is lower than anticipated which directly affects the total amount of fluid that can be injected.
d. The viscosity of the emulsion is within an acceptable range.

It was determined that the formation would not accept additional fluids at a reasonable injection rate about mid-day on Sunday, March 3, 2002. The injection rate was down to less than 1 gallon per minute for the entire system. As a consequence it was decided to wait for approximately one month before trying to inject additional substrate.

On April 3, 2002, Barton & Loguidice personnel injected 55 gallons of substrate into well IW-17. As a result of this activity, the decision was made to proceed with injecting the remaining

pre-mixed substrate. On April 29, 2002, Terra Systems, Inc. utilized the low pressure injection system to inject the remaining prepared emulsion into the pilot area. A total of 5,777 gallons of the emulsion containing 9,588 pounds of the soybean oil and surfactant mix, 94 pounds of a quick release substrate package, and 5.9 pounds of sodium bromide was injected. Table 2 summarizes the quantity (in gallons) of fluid injected into each of the wells during all three injection events.

Injection well IW-16 took the most fluid, 1,190 gallons. Wells IW-13, IW-14, and IW-15 also took more than 500 gallons of fluid. Wells IW-8, IW-10, and IW-12 accepted less than 200 gallons of the emulsion. Well IW-12, which accepted the least emulsion, was in the center of the cell and influenced by the injections in the surrounding wells IW-17, IW11, IW-13, and IW-19. The emulsion was injected throughout the treatment area. Approximately 2,200 gallons of the emulsion was injected into injection wells IW-8, IW-9, IW-10, IW-16, and IW-18 upgradient of the monitoring wells where it should provide a continuous source of organic carbon.

4.5 Operating Parameters

The major operating parameters needed to assess the performance and cost of the bioremediation system were considered to be substrate concentrations and substrate longevity.

4.6 Materials

The test area was injected with emulsified soybean oil in August 29 to September 1, 2000. The key objective of the pilot study is to determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site. TSI formulated an emulsion containing soybean oil, lecithin (a soybean derivative that acts as an emulsifier), and water to provide required organic carbon. The soybean oil is broken down into smaller organic molecules and hydrogen that are then used by the dechlorinating bacteria. In the second injection event, soybean oil, a surfactant mix, a quick release substrate package, sodium bromide (a tracer), and activated carbon-treated water was used to prepare an emulsion.

5.0 RESULTS

The bioremediation pilot study at the Photocircuits Corporation site is being conducted to assess the applicability of substrate injection to accelerate the degradation of the chlorinated contaminants of concern and to identify optimal operating parameters. These data will be used to determine the expected costs and performance of a full-scale system at the site.

5.1 Demonstration Objectives and Approach

The objectives of the pilot in situ bioremediation project are as follows:

- Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.
- Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.
- Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.
- Determine what role bioremediation technology has in the overall cleanup strategy for the site.

5.2 Performance Evaluation Criteria

The performance criteria considered in evaluating this in situ anaerobic bioremediation system included:

- Substrate transport and utilization in the remediation study area,
- Contaminant degradation rates and the reduction in mass of the contaminants,
- Fate of chlorinated solvent degradation compounds, and
- Levels to which contaminants can be reduced.

The evaluation data were collected by a monitoring program of seven field sampling events over a 19 month period.

5.3 Organization of Data

The analytical data from the pilot collected from each of the seven sampling events are summarized in the following five tables.

- Table 3 presents the volatile organic data (VOCs), final biodegradation byproducts (ethene and ethane), important electron acceptors (total iron, sulfate, nitrate, and methane), and electron donor as represented by total organic carbon (TOC).

- Table 4 converts the concentrations of the chlorinated ethenes and chlorinated ethanes to micromolar units so that one unit of PCE is equivalent to one unit of TCE, cDCE, VC, and ethene. Similarly one unit of 1TCA is equivalent to one unit of 1DCE, tDCE, 1DCA, CA, or ethane.

- Table 5 presents the field data collected in January and April 2002.

- Table 6 summarizes the changes between the samples collected immediately after the oil emulsion injection and the samples collected nineteen months later. For wells MW-14, MW-7, and SMP-4, samples could not be collected for these wells in April 2002 because of the accumulation of emulsion. Positive changes indicate that the concentrations of the analyte have decreased. A negative change indicates that the concentrations have increased. In a number of cases, the contaminants were not detected in the initial samples collected after emulsion injection or in the samples collected after sixteen months. In these cases, the percent change was calculated using the analyte detection limit and the percent changes are designated as greater than (>) or less than (<) the calculated change.

- Table 7 summarizes the changes between the samples collected on 3/28/01 and the samples collected on 1/9-12/02 for well MW-9 and between 3/28/01 and 4/3/02 for wells MW-8, MW-12, and MW-13. As noted previously, it is not anticipated that these wells will be impacted during the study period.

- Table 8 summarizes the changes in the chloroethenes, chloroethanes, electron acceptors, and electron donor for all wells from the beginning of the pilot in August-September 2000 to January 2002 or April 2002.

5.4 Project To Date Results

The following table summarizes the status of the key performance measures for this project as of January, 2002. Details are described in subsequent sections..

Performance Measures	Values/Results
Treatment Volume: Soil Ground Water Treated:	 Approximately 92' X 157' X 60', 866,640 ft^3 Approximately 1,620,617gallons
System substrate transport effectiveness:	Demonstrated distribution throughout pilot area
Substrate effectiveness:	Enhanced dechlorination
Substrate viability	Lasted for more than one year
Total volatile contaminant degradation rates; 100 mg/L concentration levels 1 – 100 mg/L concentration levels	 329 µg/L-day 2.3 to 29 µg/L-day
Reduction of total contaminants of concern:	Achieved reductions of 28% to 96% except in MW-14 and MW-7 (through 1/8/02), and SMP-1
Chlorinated solvent degradation product production	General decline in all contaminants with some temporary increases in degradation products, followed by reduction of the degradation products themselves by biological degradation
Waste generated	None
Achievable contaminant reduction levels:	Estimated 90% within 46 months

5.4.1 Chlorinated Ethene Results

In the monitoring wells within the pilot cell, cis-1,2-DCE and VC were the predominant chlorinated ethenes with little of the parent compounds, PCE or TCE, being detected except for TCE in SMP-1 in December 2000 through April 2002. Concentrations greater than 1,000 ug/L of chlorinated ethenes were initially only detected in SMP-1 and DMP-3. TCE concentrations have increased in SMP-1 and to a lesser extent in MW-7 through the last sampling point for this well in January 2002. The increases may be a result of dissolution of PCE and subsequent biodegradation to TCE, dissolution of TCE from a source zone, or an inadequate supply of substrate. There were increases in cDCE and/or VC concentrations in MW-14, MW-7, and SMP-1 from 3/28/01 to 1/8/02 or 4/3/02. Over the 19 months of pilot operation, cDCE and VC concentrations have declined in wells DMP-1 and DMP-3. cDCE and VC were not detected in September 2000 and April 2002 in wells SMP-3 and DMP-4. We expect that the VC concentrations will decrease as it is converted to ethene. Low levels of acetylene, an abiotic degradation product from the reaction of PCE or TCE with ferrous sulfide, were detected in wells MW-14, SMP-1, and SMP-3 in January and April 2002.

As previously discussed, the goal of the process is to convert PCE into ethene because the ethene is considered to be environmentally acceptable. Ethene has not been associated with long-term toxicological problems and is a natural occurring plant hormone (Sims et al 1991). Unfortunately, given the field conditions, it is difficult to conduct a material balance. Ethene may be converted to carbon dioxide, ethane, or another product. Ethene may also be transported away with the groundwater, or production of ethene may have slowed due to some limitation on the microbial population including lack of substrate, insufficient nutrients, or lower concentrations of the parent compounds.

Ethene concentrations have increased in wells MW-14 (through1/8/02), MW-7 (through 1/8/02), SMP-3 (through 4/2/02), and SMP-4 (through 1/8/02) from the initial levels observed on 8/31/00-9/1/00. Ethene concentrations for the other four wells of the original group were lower than measured initially. The continued presence of ethene in all of the wells in the pilot area shows that complete dechlorination of the chlorinated ethenes is occurring. Ethene increased in MW-12 and has not been detected in the other downgradient wells.

The addition of soybean oil emulsion has resulted in an increase in intermediate and final daughter products from the chlorinated ethenes in pilot area wells MW-14, MW-7, SMP-3, SMP-4, and MW-12. Wells DMP-1 and SMP-4 showed decreases in the parent or daughter products. Well SMP-1 has recently shown an increase in TCE and cDCE presumably as substrate has become limiting. With the reinjection of the substrate, the TCE and cDCE concentrations in SMP-1 should begin to decline. Both VC and ethene concentrations are down in DMP-3. Well DMP-4 has ethene only.

In the downgradient monitoring wells sampled in March 2001, July 2001, January 2002, and April 2002, three of the four wells had parent compounds PCE and/or TCE (MW-8, MW-12, and MW-13). In March 2001, concentrations greater than 1,000 ug/L of chlorinated ethenes were detected in MW-12 only. Increases in the VC and ethene concentrations were noted in MW-12 concurrent with the reduction in the TCE and cDCE concentrations. The emulsion injections appear to have had an effect on MW-12 based upon the increases in ethene, methane, and TOC.

The very low levels of TCE in MW-8 have fallen to non-detect levels in April 2002. PCE, TCE, cDCE, and VC concentrations have increased slightly in MW-13. The area around MW-13 appears to be substrate-limited and has largely not been impacted by the oil emulsion injection.

5.4.2 Chlorinated Ethane Results

The analytical data for the pilot test to date provides evidence for biodegradation of the chlorinated ethanes. Wells DMP-1, SMP-3, DMP-3, and SMP-4 had the highest initial concentrations of total chlorinated ethanes with greater than 1,000 µg/L. 1TCA was the primary chlorinated ethane contaminant in wells SMP-3 and DMP-3. Reduced products such as 1,1-dichloroethane, chloroethane, and ethane predominated in wells MW-14, MW-7, SMP-1, DMP-1, SMP-4, and DMP-4.

Well SMP-3 has shown a 96% (178,000 µg/L to 7,610 µg/L) reduction in the 1TCA concentrations. Between 46% (38,200 to 20,500 µg/L) and 28% (5,230 to 3,770 µg/L) reductions in the 1DCA concentrations were observed in SMP-3 and DMP-3, respectively. CA concentrations have declined by 98% in DMP-1 (3,290 to 70 µg/L) and by 65% in DMP-3, 26% in SMP-4 (through 1/8/02), and 46% in DMP-4. Based upon these results and laboratory studies currently underway with an anaerobic culture derived from the Photocircuits groundwater, we believe that direct utilization of 1TCA and 1DCA may be occurring rather than a reductive dechlorination reaction where daughter products such as CA are produced and degraded. Acetic acid has been reported as a byproduct of 1TCA degradation (Lee and Davis 2001). Alternatively, sulfides generated from the reduction of sulfate may be reacting abiotically with the 1TCA and 1DCA (Gander et al. 2001).

Well SMP-4 has shown decreases in the 1TCA, 1DCA, CA, and ethane concentrations over the sixteen months following the first injection of the oil emulsion. However, there was a rebound in concentrations of these compounds between December 2000 and January 2002. Higher concentrations of 1TCA and some daughter products were also observed in April 2002 for wells SMP-1, DMP-1, and DMP-4 than had been observed in September 2000. Wells MW-14, MW-7, and SMP-4 had higher concentrations of 1TCA and daughter products in January 2002; these wells were not sampled in April 2002. The release of VOCs adsorbed into the oil may be one explanation for these increases. A second potential explanation is the establishment of a concentration gradient that facilitates desorption from contaminated surfaces as a result of microbial stimulation.

Relatively low levels of 1TCA and daughter products were found in downgradient monitoring wells MW-12 and MW-13, which were first monitored for this program in March 2001. No chlorinated ethanes were found in MW-8 or MW-9. 1DCA and ethane concentrations have increased in MW-12, but tDCE, 2DCA, and 1DCE concentrations have fallen slightly. In MW-13, 1TCA, 1DCA, 1DCE, and ethane concentrations have decreased slightly. The substrate injections have had little impact on the downgradient wells except potentially MW-12 where the TOC increased to 73 mg/L in April 2002. .

5.4.3 Other Organic Compounds Results

Several other organic compounds were detected in the groundwater including acetone, methylene chloride, 2-butanone, toluene, benzene, p-ethyltoluene, 1,3,5-trimethylbenzene, 2-chlorotoluene,

4-chlorotoluene 1,2,4-trimethylbenzene, naphthalene, o-xylene, n-propylbenzene, and methyl tert butyl ether (MTBE). Over the nineteen months of the pilot operation to date, acetone concentrations decreased by >99% in DMP-1, but increased in MW-14 (through 1/8/02). Methylene chloride decreased in many wells with declines by as much as >94 percent in SMP-1, >98% in DMP-1, 946% in SMP-3, >96% in DMP-3, 77% in SMP-4 (through 1/8/02), and 46% in DMP-4. Methylene chloride can also be anaerobically degraded. Toluene concentrations have declined in five wells, but increased in two wells, MW-14 (through 1/8/02) and SMP-1. Toluene can be also degraded anaerobically. The addition of soybean oil may have little effect on its biodegradation of toluene as dechlorinators are probably not involved in the biotransformation of toluene. 2-Chlorotoluene concentrations declined in wells SMP-4 (through 1/8/02) and DMP-4, but increased in MW-7 (through 1/8/02) and DMP-1. 2-Chlorotoluene may be biodegraded to toluene and potentially further under anaerobic conditions. MTBE was first detected at 9.0 µg/L in SMP-3 in July 2001. MTBE was found at levels up to 125 µg/L in DMP-3, SMP-1, SMP-3, and DMP-4 in January 2002. MTBE was not found in any of the monitoring wells in April 2002. Either the MTBE has flushed through the system or there was a problem with the laboratory analyses.

Few of the other contaminants were found in the downgradient wells. 2-Chlorotoluene and 4-chlorotoluene have increased in MW-12 by 831% and 859% between 3/28/01 and 4/3/02. A low level of o-xylene was found in MW-12 in January 2002, but none was detected in April 2002. Acetone, benzene, and 2-chlorotoluene were detected in MW-13, but only 2-chlorotoluene has increased slightly.

5.4.4 Sum of VOAs

The sum of the concentrations of all of the contaminants in each well was calculated excluding the final degradation endproduct gases, ethene and ethane. The sum of the VOAs has declined by up to 96% in DMP-1 with large decreases in SMP-3 (87%), DMP-3 (45%), and DMP-4 (48%). A more moderate decline was observed in SMP-4 (28% through 1/8/02). The sum of VOAs has increased by 4529% in MW-14 through 1/8/02 as the contaminated groundwater displaced during injection came back into the well and potentially as VOCs adsorbed into the oil were released. Increases in the sum of VOAs were also observed to a lesser degree in MW-7 (-33 through 1/8/02) and SMP-1 (-136%). The overall average of the sum of the volatiles has declined by 52% over the course of the pilot. This average includes the wells sampled on 4/2/02 and the three wells last sampled on 1/8/02. Increased biodegradation rates are expected as substrate limitations are overcome with the second injection of substrate.

A first order degradation half-life of 495 days was calculated for the average total volatile contaminants within the pilot cell. Based upon this degradation rate, 90 percent of the total contaminants should be removed within 46 months.

Since 3/28/01, the total volatiles in the downgradient wells outside of the influence of the substrate injection have fallen in MW-8, but increased in MW-12 and MW-13.

5.4.5 Substrate Distribution

The total organic carbon concentrations in April 2002 ranged from 41 mg/L in DMP-1 to 1,600 mg/L in SMP-3. Wells MW-7, MW-14, and SMP-4 contained the emulsion in April 2002 and

were not sampled. They presumably contain very high levels of TOC. TOC levels were below 50 mg/L in April 2002 only in well DMP-1. A substrate level of 50 mg/L TOC should provide sufficient carbon to support dechlorination and other electron accepting processes such as methanogenesis and sulfate-reduction. TOC levels increased from the January sampling event in all wells as a result of the February-April 2002 injection event. TOC levels also increased in the downgradient wells MW-12 and MW-13. Downgradient wells MW-8, MW-9, and MW-13 appear to be substrate-limited.

5.4.6 Electron Acceptor Results

As the microbes breakdown the emulsion, sulfate would be depleted and the concentrations of iron and methane would increase. Nitrate-nitrogen was present in January 2002 at low concentrations of <0.13 to 0.085 mg/L. and is a minor electron acceptor. The predominant electron acceptor in the groundwater in January 2002 was sulfate with concentrations that ranged from 146 mg/L in DMP-4 to 1,640 mg/L in SMP-3. Sulfate concentrations have declined from the initial concentrations in September 2000 in wells MW-14 (92% through 1/8/02), DMP-1 (96% from 23,500 to 1,200 mg/L) as would be expected with consumption of the oil emulsion. However, sulfate levels have increased in MW-7 (though 1/8/02), SMP-1, SMP-3, DMP-3, SMP-4 (though 1/8/02), and DMP-4 over the course of the pilot. With the recent injection of the emulsion, there should be sufficient substrate available to remove the sulfate. Total iron concentrations within the pilot in January 2002 ranged from 5.39 mg/L in SMP-3 to 279 mg/L in MW-14 (though 1/8/02), which indicated that iron is also an important electron acceptor. Total iron concentrations have increased in two of the eight wells in the pilot area. The drop in dissolved iron concentrations in the other wells may be due to precipitation of the ferrous iron with sulfide produced from the utilization of sulfate. During the most recent sampling event in January 2002, methane was detected in all wells with methanogenic conditions (>1,000 µg/L) in MW-14 (though 1/8/02), MW-7 (though 1/8/02), SMP-1, SMP-3, DMP-3, and SMP-4 (though 1/8/02). Methane concentrations have increased in six wells in the pilot area between September 2000 to January 2002 or April 2002.

Well MW-8 appears to be under aerobic conditions based upon the presence of nitrate and sulfate, and the low levels of iron and methane. This well is largely uncontaminated. While MW-9 has little organic contamination, it appears to have been impacted by the biodegradation processes upgradient as it has elevated iron and methane levels. Well MW-12 is under methanogenic conditions based upon the elevated methane levels. Iron and sulfate are also high in MW-12. Methane concentrations are lower in MW-13 and there is little iron. Nitrate and sulfate are present suggesting that well MW-13 is under nitrate-reducing conditions.

5.4.7 Field Parameters

Field parameters including water level, pH, temperature, specific conductivity, redox potential, dissolved oxygen, and bromide (a tracer added with the emulsion) were collected in January and April 2002 for wells MW-7, SMP-1, DMP-1, SMP-3, DMP-3, SMP-4, DMP-4, and MW-8. Field parameters were available for downgradient wells MW-9, MW-12, and MW-13 for the April 2, 2002 sampling event only. The water levels ranged between 6.42 feet (SMP-1) to 7.96 feet (MW-8) below the top of the casing for wells from which this data was collected in January 2002. The pH was generally neutral; between 6.9 and 7.6. Wells SMP-3 and W-8 had elevated pH readings, 8.7-9.9 and 8.4-8.6, respectively. The basic conditions could inhibit microbial

degradation. The pH of SMP-3 dropped from 9.9 to 8.7 between January and April 2002. Downgradient wells MW-12 and MW-13 were slightly acidic, 6.2 to 6.5. Groundwater temperatures ranged between 11.5 to 18.0 °C. In general the specific conductivity of the groundwater was high, between 2,660 and 5,560 umhos/cm. Downgradient wells MW8, MW-9, and MW-13 had lower specific conductivity readings of 183 to 200 umhos/cm.

Negative redox potentials of –40 (MW-7) to -170 mV (SMP-4) were found in the wells within the pilot cell in April 2002. Downgradient wells MW8 and MW-9 had positive redox potentials in April 2002, which is consistent with the low levels of contaminants, found in these wells. Although well MW-13 has higher contaminant levels, its redox potential was also positive. Low (<1.0 mg/L) dissolved oxygen readings were observed in wells MW-7, SMP-4, and DMP-4. Higher dissolved oxygen levels were found in SMP-1, DMP-1, SMP-3, and DMP-3; the high dissolved oxygen levels are not consistent with the low redox potentials and anaerobic conditions found in these wells. Bromide was injected with the emulsion. Wells SMP-1, DMP-1, DMP-3, DMP-4, and MW-12 had bromide levels of greater than 10 mg/L. These wells generally had elevated TOC levels. In contrast, a low bromide level of 5 mg/L was found in well SMP-3 that had the highest TOC reading of any well sampled in April 2002.

6.0 DISCUSSION

Previous studies have demonstrated the anaerobic dechlorination of PCE using aquifer solids and water in the laboratory (Parsons et al. 1985, Scholz-Muramatsu et al. 1995, and DiStefano et al. 1991). Previous field studies have also demonstrated the anaerobic dechlorination of PCE (Beeman et al. 1994, Ellis et al. 2000). Therefore, microbial reductive dehalogenation is a potential remedial mechanism for halogenated compounds in groundwater aquifers.

The objective of the technology is to convert PCE into ethene. The produced ethene is considered to be environmentally acceptable, because ethene has not been associated with long-term toxicological problems and is a natural occurring plant hormone (Sims et al. 1991). Furthermore, ethene is known to further biodegrade to carbon dioxide under aerobic environmental conditions (Beeman et al 1994).

VC has been thought to persist in anaerobic environments and to be more toxic to bacteria than the parent compounds (Barrio-Lage et al. 1991). However, subsequent work has clearly established that VC is biodegraded to ethene and ethane. The pattern of increase and disappearance of cDCE and VC is suggestive of microbial succession.

Conditions continue to be favorable for accelerated anaerobic biodegradation of the chlorinated solvents at the Photocircuits site based upon the following positive results from the pilot to date including:

- decreases in the parent compound concentrations observed in many wells, particularly the large drops in the 1TCA and 1DCA concentrations in wells SMP-3 and DMP-3
- increases in the daughter products including final products ethene and ethane in many of the wells.
- good distribution of substrate and its consumption
- prevalence of reducing conditions based upon the removal of sulfate and the production of dissolved iron and methane

7.0 CONCLUSIONS

Although the pilot study is an on-going program, there is now sufficient data to facilitate a comparison of the project to date results with the project's objectives. The following summary presents the project objectives in bold with the results.

Determine if the addition of a food grade carbon source will enhance the extent and rate of chlorinated solvent biodegradation at the site.

The overall average of the sum of the volatiles has declined by 52% over the course of 19 months. Increases in intermediate and final daughter products from the chlorinated ethenes and ethanes have been observed in all of the primary monitoring wells.

Degradation rates for the total VOCs are as high as 329 ug/L per day in higher concentration areas. In areas with lower total volatile concentrations, degradation rates range from 2.3 to 29 µg/L per day. Wells MW-7 and MW-14 have shown increases in total VOCs through their last sampling point in January 2002. An increase in the total VOCs was also noted in well SMP-1.

Determine the rate of chlorinated solvent biodegradation to estimate the time frame required for contaminant removal.

A first order degradation half-life of 495 days was calculated for the average total volatile contaminants within the pilot cell. This average includes the wells sampled on 4/2/02 and the three wells last sampled on 1/8/02. Based upon this degradation rate, 90% of the total contaminants should be removed within 46 months.

Determine if the food grade carbon source can be adequately distributed in the formation such that the microorganisms can utilize it.

Total organic carbon (TOC) levels in excess of 50 mg/L were established in all eight of the primary monitoring wells in the study area. The TOC levels after system start up ranged from 39 mg/L to 23,500 mg/L. TOC levels declined from the beginning of the pilot in most wells as the emulsified oil was utilized. TOC levels rose in all wells in the pilot cell after the second injection of the emulsion. Although it is not possible to do a mass balance because of site conditions, evidence of primary contaminant reduction combined with increases in intermediate and final daughter products strongly suggests that the TOC decreases are a result of biological utilization.

Determine what role bioremediation has in the overall remediation strategy for the site.

Based on the results to date, it appears that bioremediation can cost effectively destroy the contaminants in an acceptable time frame. As a consequence, it appears that bioremediation will be the primary treatment technology for contaminant destruction at this site.

The one unexplained observation is the increase in contaminant concentrations in MW-14 and MW-7 through 1/8/02, and in SMP-1. There are several potential reasons for the increased

concentrations: 1) desorption of contaminants adsorbed to the soil due to enhanced biological activity may be contributing to the increase; or 2) contaminated groundwater displaced during the injection process could be moving back into the well. We are working to understand this phenomenon.

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8.0 REFERENCES

Barrio-Lage, G. A., F. Z. Parsons, R. M. Narbaitz, P. A. Lorenzo, and H. E. Archer. 1990. Enhanced anaerobic biodegradation of vinyl chloride in ground water. *Environ. Toxicol. Chem.* 9:403-415.

Beeman, R. E., S. H. Shoemaker, J. E. Howell, E. A. Salazar, and J. R. Buttram. 1994. A field evaluation of in situ microbial reductive dehalogenation by the biotransformation of chlorinated ethenes. In R. E. Hinchee, A. Leeson, L. Semprini, and S. K. Ong, ed., *Bioremediation of Chlorinated and Polycyclic Aromatic Hydrocarbon Compounds*, Lewis Publishers, Boca Raton, FL. pp. 14-27.

Butler, E. C. and K. F. Hayes. 2000. Kinetics of the transformation of halogenated aliphatic compounds by iron sulfide. *Environ. Sci. Technol.* 34(3):422-429.

DiStefano, T. D., J. M. Gossett, and S. H. Zinder. 1991. Reductive dehalogenation of high concentrations of tetrachloroethene to ethene by an anaerobic enrichment culture in the absence of methanogenesis. *Appl. Environ. Microbiol.* 57(8):2287-2292.

Ellis, D. E., E. J. Lutz, J. M. Odom, R. J. Buchanan, M. D. Lee, C. L. Bartlett, M. R. Harkness, K. A. DeWeerd. 2000. Bioaugmentation for accelerated in situ anaerobic bioremediation. *Environmental Science and Technology*34(11):2254-2260.

Gander, J. W. G. F. Parkin, and M. M. Scherer. 2001. Geomicrobiological interactions among iron sulfide minerals and methanogenic consortia. In Situ and On-Site Bioremediation Poster Abstracts. Sixth International Symposium, June 4-7, 2001. San Diego, CA. Section C8.

Interstate Technology and Regulatory Cooperation Work Group (ITRC). 2001. *Technical and Regulatory Guidance for In Situ Chemical Oxidation of Contaminated Soil and Groundwater.* Prepared by the In Situ Chemical Oxidation Work Group, June.

Lee, M. D. and J. W. Davis. 2000. Natural remediation of chlorinated organic compounds. In Swindoll, M., R. G. Stahl, Jr. and S. J. Ells, editors. *Natural Remediation of Environmental Contaminants: Its Role in Ecological Risk Assessment and Risk Management.* SETAC Press, Pensacola FL. p. 199-245.

Parsons, F., G. B. Lage, and R. Rice. 1985. Biotransformation of chlorinated organic solvents in static microcosms. *Environ. Toxicol. Chem.* 4:739-742.

Scholz-Muramatsu, A. Neumann, M. Meβmer, E. Moore, and G. Diekert. 1995. Isolation and characterization of *Dehalospirillum multivorans* gen., sp. Nov., a tetrachloroethene-utilizing, strictly anaerobic bacterium. *Arch. Microbiol.* 163:48-56.

Semprini, L., Grbic-Galic, D., McCarty, P.L, and Roberts, P.V., 1992. Methodologies for Evaluating In-situ Bioremediation of Chlorinated Solvents. EPA/600/R-92/042.

Sims, J. L., J. M. Suflita, and H. R. Russell. 1991. *Reductive Dehalogenation of Organic Contaminants in Soils and Ground Water.* EPA/540/4-90/054. Superfund Technology Support Center for Ground Water, U. S. EPA, Ada, OK.

U.S. Department of Energy. 1998. Cost and Performance Report – In Situ Anaerobic Bioremediation, Pinellas Northeast Site, Largo, Florida. Innovative Treatment Remediation Demonstration. April 1998. Sandia National Laboratories, Albuquerque, NW and Hazardous Waste Remedial Actions Program, Oak Ridge, TN. 33 p.

United States Environmental Protection Agency. 1996. "Pump-and-Treat Ground-Water Remediation, A Guide for Decision Makers and Practitioners", EPA/625/R-95/005, July, 1996, p.2.

FIGURES

TABLES

Table 1. Injection Volumes During Week of February 26, 2002

Well #	2/26/02	2/27/02	2/28/02	3/1/02	3/2/02	3/3/02	Total
IW-8					58	65	123
IW-9			278		13	42	333
IW-10					103	34	137
IW-11				155		32	187
IW-12					13	52	65
IW-13				615	57	17	689
IW-14			473	182	83	102	840
IW-15	504	20		47	73	29	673
IW-16			465	501	67	27	1060
IW-17				205	29	35	269
IW-18				129	126	28	283
IW-19			45	264	61	29	399
Total	504	20	1261	2098	683	492	5058

Table 2. Injection Volumes Per Well from 2/26/02 till 4/29/02

Well #	2/25/02 – 3/03/02	04/3/02	04/29/02	Total
IW-8	123			123
IW-9	333		116	449
IW-10	137			137
IW-11	187		262	449
IW-12	65			65
IW-13	689		21	710
IW-14	840		36	876
IW-15	673			673
IW-16	1060		130	1190
IW-17	269	55	53	377
IW-18	283			283
IW-19	399		46	445
Total	5058	55	664	5777

Table 3. Photocircuits Anaerobic Pilot Analytical Summary

Well		MW-14						MW-7					
Date		8/31/00	10/19/00	12/20/00	3/28/01	7/11/01	1/8/02	8/31/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02
Days		0	49	111	209	314	495	0	49	111	208	314	495
Tetrachloroethene	µg/L		<1.4	<0.40	<5.5	<4.0	<2.4	<0.40	<0.56	<0.40	<2.2	<0.20	<0.12
Trichloroethene	µg/L	<0.85	<1.35	<0.85	<10	<3.4	<3.4	<0.85	19.3	<0.85	<4	16	2.7
cis-1,2-Dichloroethene	µg/L	<0.95	<1.7	<0.95	<15	<2.8	<3.6	47.3	283	355	149	187	8.3
Vinyl Chloride	µg/L	<1.75	10.6	<1.75	114	145	173	39.3	67.1	139	60	63.9	10.5
Ethene	µg/L	43	47	60	65	130	90	63	170	110	33	94	110
Acetylene	µg/L						5.7						<1.2
1,1,1-Trichloroethane	µg/L	14.4	<1.7	8.9	994	2040	1520	<0.55	<0.62	<0.55	<4	<0.16	<0.14
1,1-Dichloroethane	µg/L	126	216	293	9230	18800	14100	122	214	268	135	207	193
trans-1,2-Dichloroethene	µg/L	<1.35	<1.40	<1.35	<11	<2.8	<5.8	<1.35	<0.56	<1.35	<4.4	2.6	2.1
1,2-Dichloroethane	µg/L	<0.80	<0.95	<0.80	<10	34.2	<3.2	<0.80	<0.38	<0.80	<4	<0.13	3.7
1,1-Dichloroethene	µg/L	<1.05	6.3	<1.05	443	751	542	<1.05	<0.96	<1.05	<3.6	1.9	<0.22
Chloroethane	µg/L	15.6	<1.25	<1.65	132	298	501	258	181	201	160	269	390
Ethane	µg/L	52	69	48	34	66	49	<6	130	81	34	71	68
Acetone	µg/L	97.8	170	126	<74	551	986	<9.45	52.2	<9.45	<29.6	18.5	<2.3
Methylene Chloride	µg/L	15.1	<1.50	<1.0	220	156	134	12.8	6.0	<1	51.6	3.9	8.0
2-Butanone	µg/L	124	75.3	<5.1	<125	863	344	<5.1	<1.64	<5.1	<50	<6.25	17.2
Toluene	µg/L	3.0	<0.80	<0.80	<7.5	32.4	25	6.2	8.4	8.3	<3	8.6	0.95
Benzene	µg/L	<0.70	<0.70	<0.70	<5	<2.6	<3.4	4.0	3.5	<0.7	<2	2.8	6.5
p-Ethyltoluene	µg/L	<1.2	<1.05	<1.2	<8	<4.4	<4.8	<1.2	<0.68	<1.2	<3.2	<0.22	<0.24
1,3,5-Trimethylbenzene	µg/L	<0.60	<1.50	<0..60	<17	<2.2	<2.4	<0.60	<0.60	<0.6	<6.8	<0.11	<0.12
2-Chlorotoluene	µg/L	<0.85	<1.35	<0.85	<10.5	<3.2	<4.2	<0.85	5.2	<0.85	<4.2	6.3	8.4
1,2,4-Trimethylbenzene	µg/L	<0.65	<1.25	<0.65	<11	<4.4	<2.6	<0.65	<0.50	<0.65	<4.4	1.2	0.93
Naphthalene	µg/L	<1.35	<0.90	<1.35	<9.5	<8.2	<5.4	<1.35	<0.36	<1.35	<3.8	1.2	<0.27
o-Xylene	µg/L	<0.40	<1.35	<0.40	<8	<3.2	<3.2	<0.40	<0.54	<0.4	<3.2	1.1	<0.16
n-Propylbenzene	µg/L	<0.70	<1.40	<0.70	<10.5	<6.2	<2.8	<0.70	<0.56	<0.7	<4.2	<0.31	<0.14
Methyl T-Butyl Ether	µg/L	<1.25	<1.15	<1.25	<14	<1.6	<3.6	<1.25	<0.46	<1.25	<5.6	<0.080	<0.18
Sum VOAs (w/o Gases)	µg/L	396	478	428	11133	23671	18325	490	840	971	556	791	652
Methane	mg/L	44	58	380	1800	6400	8050	660	1900	760	1050	5930	5050
Iron, Total	mg/L	55.2	13.2	69	197	188	279	2.22	1.84	3.93	6.72	8.78	13.1
Sulfate	mg/L	5470	779	32.6	307	1270	441	104	117	264	203	68.9	949
Nitrate-Nitrogen	mg/L		0.15	0.17	<0.025	<0.0015	<0.13		<0.015	0.023	0.029	0.017	0.085
Total Organic Carbon	mg/L	23500	868	1990	2590	3530	2630	38.8	53.1	60	72.9	58.5	1.67

Table 3 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-1							DMP-1						
Date		8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Days		0	48	111	208	314	495	579	0	48	111	208	314	495	579
Tetrachloroethene	µg/L	<16	<0.40	<22	<5.5	<2.0	<6.0	<12	<0.40	<0.080	<0.40	<5.5	<1.0	<0.60	<0.48
Trichloroethene	µg/L	<34	79	860	1530	25.3	4410	26600	<0.85	<0.17	<0.85	<10	4.5	<0.85	29.3
cis-1,2-Dichloroethene	µg/L	24900	37500	30100	<0.27	12300	18000	42500	50.4	1.70	17.4	73.5	38.4	<0.90	44.3
Vinyl Chloride	µg/L	4710	5990	5090	4770	4230	3490	1780	188	3.5	40	125	42.7	<4.25	62
Ethene	µg/L	930	2400	1140	900	1890	650	800	560	1080	920	690	110	93	160
Acetylene	µg/L						<11	7.4						<1.2	<1.2
1,1,1-Trichloroethane	µg/L	<22	<0.55	<34	356	158	<7.0	<11	<0.55	<0.11	<0.55	193	28.1	<0.70	<0.44
1,1-Dichloroethane	µg/L	506	486	628	708	536	456	366	91.8	17.6	357	1130	1320	423	240
trans-1,2-Dichloroethene	µg/L	<54	69.9	<40	132	34.5	68.5	376	<1.35	<0.27	<1.35	<11	<0.70	<1.4	3.9
1,2-Dichloroethane	µg/L	<32	<0.80	<17	<10	<1.3	<8.0	<11.5	<0.80	<0.16	<0.80	<10	14.9	<0.80	<0.46
1,1-Dichloroethene	µg/L	<42	64.3	<27	184	55.1	143	296	<1.05	<0.21	<1.05	<9	<0.70	<1.10	<0.6
Chloroethane	µg/L	<72	71.6	<53	<15	<1.8	<33.5	<30.5	3290	43.4	232	159	193	97	69.7
Ethane	µg/L	<6	<6	<25	<25	<25	<12	<1.3	<6	<6	<50	<100	<50	0.8	<1.3
Acetone	µg/L	<378	<9.45	<166	<74	<14.4	<115	<156	8670	139	557	<74	1150	<11.5	<6.24
Methylene Chloride	µg/L	482	43.1	<56	<20.5	11.9	<18.5	<27	68.3	1.40	22.4	191	32.8	<01.85	<1.08
2-Butanone	µg/L	<204	<5.1	<68	<125	<62.5	<860	<250	<5.1	<1.02	5.1	<125	<31.3	<86	<10
Toluene	µg/L	<32	61.1	<19	126	51.4	55	194	36.5	2.80	24.1	40.5	9.1	<0.70	2.2
Benzene	µg/L	<28	4.40	<34	<5	<1.3	<8.5	<8	<0.70	<0.14	5.5	<5	<0.65	<0.85	<0.32
p-Ethyltoluene	µg/L	<48	<1.2	<20	<8	11.3	<12	<12	2.9	<0.24	<1.2	<8	<1.1	<1.2	<0.4
1,3,5-Trimethylbenzene	µg/L	<24	<0.60	<20	<17	<1.1	<6.0	<10	2.8	<0.12	<0.60	<17	<0.55	<0.60	<0.4
2-Chlorotoluene	µg/L	<34	16.3	<25	<10.5	47.3	<10.5	<13.5	23.7	<0.17	18.2	<10.5	33.7	79.7	57.6
1,2,4-Trimethylbenzene	µg/L	<26	<0.65	<0.65	<11	15.7	<6.5	<8.5	8.4	0.77	8.4	<11	4.8	4.7	3.4
Naphthalene	µg/L	<54	<1.35	<16	<9.5	21.2	<13.5	<7	3.1	<0.27	<1.35	<9.5	<2.05	<1.35	<0.28
o-Xylene	µg/L	<16	<0.40	<18	<8	11.4	<8.0	<10	<0.40	<0.080	<0.40	<8	<0.80	<0.80	<0.4
n-Propylbenzene	µg/L	<28	<0.70	<17	<10.5	<3.1	<7.0	<10.5	<0.70	<0.14	16.9	<10.5	<1.55	<0.70	<0.42
Methyl T-Butyl Ether	µg/L	<50	<1.25	<25	<14	<0.80	117	<17	<1.25	<0.25	<1.25	<14	<0.40	<0.90	<0.68
Sum VOAs (w/o Gases)	µg/L	30598	44386	36678	7806	17509	26740	72112	12436	210	1304	1912	2872	604	512
Methane	mg/L	3400	6200	2500	2060	3400	1100	2110	8200	23000	10300	4660	730	330	160
Iron, Total	mg/L	19.8	11.6	15.1	11.1	29.9	16.4	18.3	88.5	4.45	3.1	21.7	8.65	15.9	4.11
Sulfate	mg/L	236	360	443	813	905	732	513	29600	37.7	179	715	1420	1200	2070
Nitrate-Nitrogen	mg/L		0.054	0.071	12.3	0.016	<0.13	0.046		0.20	0.024	0.05	0.019	<0.13	<0.025
Total Organic Carbon	mg/L	91.7	83.4	88	59.7	45.9	23.8	63.1	299	224	137	132	54.5	8.14	41.1

Table 3 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-3							DMP-3						
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Days		0	49	111	208	314	495	579	0	49	111	208	314	495	579
Tetrachloroethene	µg/L	<80	<80	<8	13.7	12.2	<6.0	<24	<16	60.5	<4.0	<1.1	72.3	34	<12
Trichloroethene	µg/L	<170	<170	<17	<0.2	<1.7	<8.5	<34	<34	<13.5	<8.5	<2	8.6	<8.5	<8
cis-1,2-Dichloroethene	µg/L	<190	<190	<19	2.3	16.4	<9.0	<36	<38	<17	<9.5	<3	14.9	<9.0	<10.5
Vinyl Chloride	µg/L	<350	<350	<35	38.8	98.8	<42.5	<170	1040	928	818	145	785	654	397
Ethene	µg/L	84	98	39	18	110	180	220	430	450	310	290	490	360	220
Acetylene	µg/L						2.1	5.4						<1.2	<1.2
1,1,1-Trichloroethane	µg/L	178000	235000	32600	33700	13100	14500	7610	19700	14300	23400	793	24000	19500	11600
1,1-Dichloroethane	µg/L	38200	47800	4770	<0.5	17600	8860	20500	5230	4860	4200	764	3250	2260	3770
trans-1,2-Dichloroethene	µg/L	<270	<270	<27	<0.22	<1.4	<14	<56	<54	<14	<13.5	<2.2	<1.4	<14	<10
1,2-Dichloroethane	µg/L	<160	<160	<16	6	20.6	<8.0	<32	<32	<9.5	<8.0	<2	25.4	<8.0	<11.5
1,1-Dichloroethene	µg/L	<210	<210	<21	<0.27	164	146	<44	156	<24	<10.5	<1.8	168	<11	<15
Chloroethane	µg/L	<330	<330	<33	76.6	411	346	<134	5370	6970	3760	729	6630	2260	1900
Ethane	µg/L	39	45	41	23	29	17	36	5.7	9.4	44	12	8.2	8.6	16
Acetone	µg/L	<1890	<1890	<189	3690	536	<115	<460	<378	<65	<94.5	<14.8	<14.4	<115	<156
Methylene Chloride	µg/L	2400	<200	<20	14.6	122	89	152	436	149	<10	31.8	58.7	<18.5	<27
2-Butanone	µg/L	<1020	<1020	<102	<2.5	<62.5	<860	<3440	<204	<41	<51	<25	<62.5	<860	<250
Toluene	µg/L	<160	<160	<16	31.7	96.5	54.5	<28	232	134	103	15.7	140	108	84
Benzene	µg/L	<140	<140	<14	<0.1	20.6	<8.5	<34	<28	<7.0	<7.0	<1	<1.3	<8.5	<8
p-Ethyltoluene	µg/L	<240	<240	<24	<0.16	<2.2	<12	<48	<48	<17	<12	<1.6	9.9	<12	<12
1,3,5-Trimethylbenzene	µg/L	<120	<120	<12	0.63	<1.1	<6.0	<24	<24	<15	<6	<3.4	<1.1	<6.0	<10
2-Chlorotoluene	µg/L	<170	<170	<17	5.1	<1.6	<10.5	<42	<34	<13.5	<8.5	<2.1	51.5	<10.5	<13.5
1,2,4-Trimethylbenzene	µg/L	<130	<130	<13	<0.22	<2.2	<6.5	<26	<26	<12.5	<6.5	<2.2	17	<6.5	<8.5
Naphthalene	µg/L	<270	<270	<27	<0.19	<4.1	<13.5	<54	<54	<9.0	<13.5	<1.9	<4.1	<13.5	<7
o-Xylene	µg/L	<80	<80	<8	<0.	<1.4	<8.0	<32	<16	<13.5	<4.0	<1.6	<1.6	<8.0	<10
n-Propylbenzene	µg/L	<140	<140	<14	<0.21	<3.1	<7.0	<28	<28	<14.0	<7.0	<2.1	<3.1	<7.0	<10.5
Methyl T-Butyl Ether	µg/L	<250	<250	<25	<0.28	9.0	117	<36	<50	<11.5	<12.5	<2.8	<0.80	125	<17
Sum VOAs (w/o Gases)	µg/L	218600	282800	37370	37579	32207	24113	28262	32164	27402	32281	2479	35231	24941	17751
Methane	mg/L	100	140	44	36	500	1020	2000	390	890	800	930	870	1400	3850
Iron, Total	mg/L	50.6	5.91	69.6	3.92	32.5	5.39	8.46	60.4	66.8	74.3	20.8	77.5	39.0	35.8
Sulfate	mg/L	286	392	154	53.7	1050	1640	3640	124	186	137	94.6	173	188	127
Nitrate-Nitrogen	mg/L		<0.015	0.53	0.037	<0.015	<0.13	0.009		0.93	0.35	0.073	0.0030	<0.13	0.029
Total Organic Carbon	mg/L	294	432	22.7	48.1	176	34.4	1600	98.2	88.6	104	27.8	51.8	29.6	102

Table 3 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		SMP-4						DMP-4						
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Days		0	48	110	207	313	494	0	48	110	207	313	494	578
Tetrachloroethene	µg/L	13.2	<5.6	<0.80	<5.5	9.3	32	<0.40	<0.080	<0.080	<0.11	<2.0	<1.2	<0.48
Trichloroethene	µg/L	<0.85	<5.4	<1.7	<10	<1.7	<3.4	<0.85	<1.70	<0.17	<0.20	<1.7	<1.7	<0.32
cis-1,2-Dichloroethene	µg/L	143	<6.8	<1.9	<15	10.8	<3.6	<0.95	<1.90	<0.19	<0.30	<1.4	<1.8	<0.42
Vinyl Chloride	µg/L	175	34.6	37.6	72.5	111	126	<1.75	<3.50	<0.35	2.9	<0.70	<8.5	<0.20
Ethene	µg/L	220	190	220	170	160	340	250	260	220	160	<6	230	150
Acetylene	µg/L						<1.2						<1.2	<1.2
1,1,1-Trichloroethane	µg/L	3150	246	997	3100	2610	2700	56.3	130	<0.11	15.3	18.4	<1.4	<0.44
1,1-Dichloroethane	µg/L	4070	1740	1180	2230	3270	2890	29.7	20.1	<0.14	50.1	30.0	16.3	38.6
trans-1,2-Dichloroethene	µg/L	<1.35	<5.6	<2.7	<11	<1.4	<5.6	<1.35	<2.70	<0.27	3.4	<1.4	<2.8	<0.40
1,2-Dichloroethane	µg/L	26.2	<3.8	<1.6	<10	19.7	<3.2	<0.80	<1.60	<0.16	8.7	<1.3	<1.6	<0.46
1,1-Dichloroethene	µg/L	105	<9.6	<2.1	<9	48.2	130	<1.05	<2.10	<0.21	<0.18	<1.4	<2.2	<0.6
Chloroethane	µg/L	1220	827	3000	1590	945	776	2420	2580	3300	3680	2680	1210	1260
Ethane	µg/L	<6	<6	39	<10	<10	2.4	<6	<6	37	<6	<6	2.4	<1.3
Acetone	µg/L	<9.4	<26	<18.9	<74	<14.4	<46	<9.45	<18.9	<1.89	58.4	<14.4	<23	<6.24
Methylene Chloride	µg/L	295	123	<2	278	127	66.8	22.8	16.6	3.9	19.8	20.8	8.4	12.2
2-Butanone	µg/L	<5.1	<16.4	<10.2	<125	<62.5	<344	<5.1	<10.2	<1.02	<2.5	<62.5	<172	<10
Toluene	µg/L	116	37.6	25.5	<7.5	48.2	69.6	11	7.5	3.1	6.1	<1.4	6.9	10.2
Benzene	µg/L	<0.70	<2.8	<1.4	<5	<1.3	<3.4	<0.70	<1.40	<0.14	<0.10	<1.3	<1.7	<0.321
p-Ethyltoluene	µg/L	4.8	<6.8	<2.4	<8	<2.2	<4.8	3.7	<2.40	<0.24	1.2	<2.2	<2.4	<0.48
1,3,5-Trimethylbenzene	µg/L	3.2	<6.0	<1.2	<17	<1.1	<2.4	9.2	<1.20	2.5	3.4	<1.1	<1.2	6.9
2-Chlorotoluene	µg/L	45.5	<5.4	<1.7	<10.5	21.4	<4.2	64.5	44.5	17.1	31.6	31.9	34.2	40.2
1,2,4-Trimethylbenzene	µg/L	8.6	<5.0	<1.3	<11	<2.2	<2.6	18.3	15.9	5.3	<0.22	9.2	9.0	13.5
Naphthalene	µg/L	<1.35	<3.6	<2.7	<9.5	<4.1	<5.4	4.3	<2.70	<0.27	1.6	<4.1	<2.7	<0.28
o-Xylene	µg/L	<0.40	<5.4	<0.8	<8	<1.6	<3.2	4.8	<0.80	<0.008	5.0	<1.6	<1.6	3.6
n-Propylbenzene	µg/L	<0.70	<5.6	<1.4	<10.5	<3.1	<2.8	44.3	<1.40	<0.14	<0.21	<3.1	<1.4	<0.42
Methyl T-Butyl Ether	µg/L	<1.25	<4.6	<2.5	<14	<0.80	<3.6	<1.25	<2.4	<0.25	<0.28	<0.80	21.9	<0.68
Sum VOAs (w/o Gases)	µg/L	9376	3008	5240	7271	7221	6790	2689	2815	3332	3888	2790	1307	1385
Methane	mg/L	450	470	1100	3650	1800	2600	180	210	190	300	<6	250	240
Iron, Total	mg/L	76.2	38.9	47.1	54.5	41.2	17.8	48.2	39.2	42.5	85.4	116	31.6	29.1
Sulfate	mg/L	933	470	435	1700	1910	1630	133	171	98.5	209	323	146	176
Nitrate-Nitrogen	mg/L		<0.015	0.31	0.19	0.037	<0.13		0.22	0.31	0.17	<0.015	<0.13	0.051
Total Organic Carbon	mg/L	73.6	60.4	<0.94	34.6	46.5	31.0	43.7	52.4	50.9	34.6	35.7	7.1	71.7

Table 3 continued. Photocircuits Anaerobic Pilot Analytical Summary

Well		MW-8				MW-9			MW-12				MW-13			
Date		3/28/01	7/12/01	1/8/02	4/3/02	3/28/01	7/12/01	1/8/02	3/28/01	7/12/01	1/9/02	4/3/02	3/28/01	7/12/01	1/10/02	4/3/02
Days		0	314	494	579	0	314	494	0	106	287	371	0	106	288	371
Tetrachloroethene	µg/L	<0.11	<0.20	<0.12	<0.24	<0.11	<0.20	<0.24	<0.11	<0.20	<0.24	<2.4	82.8	120	216	227
Trichloroethene	µg/L	1.8	1.7	0.97	<0.16	<0.20	<0.17	<0.16	122	0.93	16.5	31	85.9	114	216	132
cis-1,2-Dichloroethene	µg/L	<0.30	1.2	<0.18	<0.21	<0.30	<0.14	<0.21	1280	18.2	430	503	784	897	1950	988
Vinyl Chloride	µg/L	<0.25	<0.070	<0.85	<0.10	<0.25	<0.070	<0.10	244	5.7	298	333	38.6	58.6	112	74
Ethene	µg/L	<6	<6	<1.3	<1.3	<6	<6		6.7	69	180	130	<6	<6	1.6	<1.3
Acetylene	µg/L			<1.2	<1.2							<1.2			<1.2	<1.2
1,1,1-Trichloroethane	µg/L	<0.20	<0.16	<0.14	<0.22	<0.20	<0.16	<0.22	<0.20	<0.16	<0.22	<2.2	40	36.7	32.2	19.7
1,1-Dichloroethane	µg/L	<0.14	<0.12	<0.25	<0.22	<0.14	<0.12	<0.22	72.2	3.7	329	684	323	351	476	305
trans-1,2-Dichloroethene	µg/L	<0.22	<0.14	<0.28	<0.20	<0.22	<0.14	<0.20	7.3	<0.14	5.6	<2.0	3.6	4.7	11.9	8.0
1,2-Dichloroethane	µg/L	<0.20	<0.13	<0.16	<0.23	<0.20	<0.13	<0.23	2.9	<0.13	1.4	<2.3	2.6	2.3	2.8	<0.23
1,1-Dichloroethene	µg/L	<0.18	<0.14	<0.22	<0.30	<0.18	<0.14	<0.30	8.4	<0.14	2.3	<3	60.6	60.4	75.5	43.6
Chloroethane	µg/L	<0.30	<0.18	<0.67	<0.61	<0.3	<0.18	<0.61	<0.30	<0.18	6.1	<6.1	<0.30	<0.18	<0.61	<0.61
Ethane	µg/L	<6	<6	<1.3	<1.3	<6	<6		<6	13	22	11	5.8	6.7	23	8.7
Acetone	µg/L	<1.48	<1.44	<2.3	<3.12	<1.48	<1.44	<3.12	<1.48	<1.44	<3.12	<31.2	<1.48	<1.44	18.7	<3.12
Methylene Chloride	µg/L	<0.41	<0.15	<0.37	<0.54	<0.41	<0.15	<0.54	<0.41	<0.15	<0.54	<5.4	<0.41	<0.15	<0.54	<0.54
2-Butanone	µg/L	<2.5	<6.25	<17.2	<5.0	<2.5	<6.25	<5.0	<2.5	<6.25	<5.0	<50	<2.5	<6.25	<5.0	<5.0
Toluene	µg/L	<0.15	<0.14	<0.14	<0.14	<0.15	<0.14	<0.14	0.97	<0.14	5.6	11.4	<0.15	<0.14	<0.14	<0.14
Benzene	µg/L	<0.10	<0.13	<0.17	<0.16	<0.10	<0.13	<0.16	5.3	<0.13	5.4	<1.6	7.1	7.1	8.0	4.7
p-Ethyltoluene	µg/L	<0.16	<0.22	<0.24	<0.24	<0.16	<0.22	<0.24	<0.16	<0.22	<0.24	<2.4	<0.16	<0.22	<0.24	<0.24
1,3,5-Trimethylbenzene	µg/L	<0.34	<0.11	<0.12	<0.20	<0.34	<0.11	<0.20	<0.34	<0.11	<0.20	<2.0	<0.34	<0.11	<0.20	<0.20
2-Chlorotoluene	µg/L	<0.21	<0.16	<0.21	<0.27	<0.21	<0.16	<0.27	393	26.9	2690	3660	16.3	43.2	76.4	27.8
4-Chlorotoluene	µg/L								14.5	<0.17	82.8	139				
1,2,4-Trimethylbenzene	µg/L	<0.22	<0.22	<0.13	<0.26	<0.22	<0.22	<0.17	<0.22	<0.22	<0.17	<1.7	<0.22	<0.22	<0.17	<0.17
Naphthalene	µg/L	<0.19	<0.41	<0.27	<0.14	<0.19	<0.41	<0.14	<0.19	<0.41	<0.14	<1.4	<0.19	<0.41	<0.14	<0.14
o-Xylene	µg/L	<0.16	<0.16	<0.16	<0.20	<0.16	<0.16	<0.20	<0.16	<0.16	2.3	<2.0	<0.16	<0.16	<0.20	<0.20
n-Propylbenzene	µg/L	<0.21	<0.31	<0.14	<0.21	<0.21	<0.31	<0.21	<0.21	<0.31	<0.21	<2.1	<0.21	<0.31	<0.21	<0.21
Methyl t-Butyl Ether	µg/L	<0.28	<0.080	<0.18	<0.34	<0.28	<0.080	<0.34	<0.28	<0.080	<0.34	<3.4	<0.28	<0.080	<0.34	<0.34
Sum VOAs (w/o Gases)	µg/L	1.8	2.9	1.0	0.0	0.0	0.0	0.0	2151	55	3875	5361	1445	1695	3196	1830
Methane	mg/L	<6	61	9.1	<0.7	300	940		420	1800	2170	1670	12	21	250	110
Iron, Total	mg/L	0.023	0.088	<0.096	<0.096	10.4	21.9		7.29	55.6	61.0	934	0.54	0.48	0.93	0.76
Sulfate	mg/L	22.6	23.4	27.4	23.2	4.43	23.1		417	824	418	1160	597	579	648	366
Nitrate-Nitrogen	mg/L	6.1	5.63	6.93	6.66	<0.025	<0.015		<0.025	0.070	0.005	0.099	3.95	4.68	3.54	4.84
Total Organic Carbon	mg/L	4.97	<0.94	<0.94	1.41	7.98	6.79		33.3	36.6	<0.94	72.6	9.52	13.3	<0.94	15.4

Table 4. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	MW-14						MW-7					
Date		8/31/00	10/19/00	12/20/00	3/28/01	7/11/01	1/8/02	8/31/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02
Tetrachloroethene	µM		<0.0084	<0.0024	<0.033	<0.024	<0.014	<0.0024	<0.0034	<0.0024	<0.013	<0.0012	<0.00072
Trichloroethene	µM	<0.0065	<0.010	<0.0065	<0.076	<0.026	<0.026	<0.0065	0.15	<0.0065	<0.030	0.12	0.02
cis-1,2-Dichloroethene	µM	<0.0098	<0.018	<0.0098	<0.15	<0.029	<0.037	0.49	2.9	3.7	1.5	1.9	0.1
Vinyl Chloride	µM	<0.028	0.17	<0.028	1.8	2.3	2.8	0.63	1.1	2.2	1.0	1.0	0.2
Ethene	µM	1.5	1.7	2.1	2.3	4.6	3.2	2.3	6.1	3.9	1.2	3.4	3.9
Acetylene	µM						0.22						<0.046
1,1,1-Trichloroethane	µM	0.11	<0.013	0.067	7.5	15.3	11.4	<0.0041	<0.046	<0.0041	<0.030	<0.0012	<0.0010
1,1-Dichloroethane	µM	1.3	2.2	3.0	93.2	189.9	142.4	1.2	2.2	2.7	1.4	2.1	1.9
trans-1,2-Dichloroethene	µM	<0.014	<0.014	<0.014	<0.11	<0.021	<0.060	<0.014	<0.0058	<0.014	<0.045	0.027	0.022
1,2-Dichloroethane	µM	<0.0081	<0.0096	<0.0081	<0.10	0.35	<0.032	<0.0081	<0.0038	<0.0081	<0.040	<0.0013	0.037374
1,1-Dichloroethene	µM	<0.011	0.065	<0.011	4.6	7.8	5.6	<0.011	<0.0099	<0.011	<0.037	0.020	<0.0023
Chloroethane	µM	0.24	<0.019	<0.026	2.0	4.6	7.8	4.0	2.8	3.1	2.5	4.2	6.0
Ethane	µM	1.7	2.3	1.6	1.1	2.2	1.6	<0.20	4.3	2.7	1.1	2.4	2.3

Contaminant	Well	SMP-1							DMP-1						
Date		8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	8/31/00	10/18/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Tetrachloroethene	µM	<0.096	<0.0024	<0.13	<0.033	<0.012	<0.036	<0.091	<0.0024	<0.00048	<0.0024	<0.033	<0.0060	<0.0036	<0.0037
Trichloroethene	µM	<0.026	0.60	6.5	11.6	0.19	33.6	202.4	<0.0065	<0.0018	<0.0065	<0.076	0.034	<0.0065	0.223
cis-1,2-Dichloroethene	µM	257	387	310.63	<0.0028	127	186	439	0.52	0.018	0.179567	0.76	0.40	<0.0093	0.46
Vinyl Chloride	µM	75	96	81	76	68	56	28	3.0	0.056	0.640	2.0	0.68	<0.068	0.99
Ethene	µM	33	86	41	32	68	23	29	20	39	33	25	3.9	3.3	5.7
Acetylene	µM						<0.42	0.28						<0.046	<0.046
1,1,1-Trichloroethane	µM	<0.16	<0.0041	<0.25	2.7	1.2	<0.052	<0.082	<0.0041	<0.00082	<0.0041	1.4	0.21	<0.0052	<0.0033
1,1-Dichloroethane	µM	5.1	4.9	6.3	7.2	5.4	4.6	3.7	0.93	0.18	3.61	11	13	4.3	2.4
trans-1,2-Dichloroethene	µM	<0.56	0.72	<0.41	1.4	0.36	0.71	3.88	<0.014	<0.0028	<0.014	<0.11	<0.0072	<0.014	0.040
1,2-Dichloroethane	µM	<0.32	<0.0081	<0.17	<0.033	<0.033	<0.081	<0.12	<0.0081	<0.0016	<0.0081	<0.10	0.15	<0.0081	<0.0046
1,1-Dichloroethene	µM	<0.43	0.66	<0.27	1.9	0.57	1.5	3.1	<0.011	<0.0022	<0.011	<0.093	<0.0071	<0.011	<0.0062
Chloroethane	µM	<1.1	1.1	<0.82	<0.23	<0.23	<0.52	<0.47	51.0	0.67	3.60	2.5	3.0	1.5	1.1
Ethane	µM	<0.20	<0.20	<0.83	<0.83	<0.83	<0.43	<0.43	<0.20	<0.20	<1.7	<3.3	<1.7	0.027	<0.043

Table 4 continued. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	SMP-3					DMP-3							
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Tetrachloroethene	µM	<0.48	<0.48	<0.048	0.083	0.074	<0.036	<0.14	<0.097	0.36	<0.024	<0.0066	0.44	0.21	<0.072
Trichloroethene	µM	<1.3	<1.3	<0.13	<0.0015	<0.013	<0.065	<0.26	<0.26	<0.10	<0.065	<0.015	0.065	<0.065	<0.061
cis-1,2-Dichloroethene	µM	<2.0	<2.0	<0.20	0.024	0.17	<0.093	<0.37	<0.39	<0.18	<0.098	<0.031	0.15	<0.093	<0.11
Vinyl Chloride	µM	<5.6	<5.6	<0.56	0.62	1.6	<0.68	<2.72	17	15	13	2.3	12.6	10.5	6.4
Ethene	µM	3.0	3.5	1.4	0.64	3.9	6.4	7.9	15.4	16.1	11.1	10.4	17.5	12.9	7.9
Acetylene	µM						0.081	0.21						<0.046	<0.046
1,1,1-Trichloroethane	µM	1334	1762	244	253	98	109	57	148	107	175	5.9	180	146	87
1,1-Dichloroethane	µM	386	483	48	<0.0051	178	89	207	53	49	42	7.7	32.8	22.8	38.1
trans-1,2-Dichloroethene	µM	<2.8	<2.8	<0.28	<0.0023	<0.014	<0.14	<0.58	<0.56	<0.14	<0.14	<0.023	<0.014	<0.14	<0.10
1,2-Dichloroethane	µM	<1.6	<1.6	<0.16	0.061	0.21	<0.081	<0.32	<0.32	<0.096	<0.081	<0.020	0.26	<0.081	<0.112
1,1-Dichloroethene	µM	<2.2	<2.2	<0.22	<0.0028	1.7	1.5	<0.45	1.6	<0.25	<0.11	<0.018	1.7	<0.11	<0.15
Chloroethane	µM	<5.1	<5.1	<0.51	1.2	6.4	5.4	<2.1	83	108	58	11	103	35	29
Ethane	µM	1.3	1.5	1.4	0.77	0.97	0.57	1.20	0.19	0.31	1.5	0.40	0.27	0.29	0.53

Contaminant	Well	SMP-4					DMP-4							
Date		9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	9/1/00	10/19/00	12/20/00	3/27/01	7/11/01	1/8/02	4/2/02
Tetrachloroethene	µM	0.080	<0.0034	<0.0048	<0.033	0.056	0.193	<0.0024	<0.00048	<0.00048	<0.00066	<0.012	<0.0072	<0.0029
Trichloroethene	µM	<0.0065	<0.041	<0.013	<0.076	<0.076	<0.076	<0.0065	<0.013	<0.013	<0.0015	<0.013	<0.013	<0.0024
cis-1,2-Dichloroethene	µM	1.5	<0.070	<0.0020	<0.15	0.11	<0.026	<0.0098	<0.020	<0.0020	<0.0031	<0.014	<0.019	<0.0043
Vinyl Chloride	µM	2.8	0.55	0.60	1.2	1.8	2.0	<0.028	<0.056	<0.0056	0.046	<0.011	<0.14	<0.0032
Ethene	µM	7.9	6.8	7.9	6.1	5.7	12.1	8.9	9.3	7.9	5.7	<0.21	8.2	5.4
Acetylene	µM						<0.046						<0.046	<0.046
1,1,1-Trichloroethane	µM	24	1.8	7.5	23	20	20	0.42	0.97	<0.00082	0.11	0.14	<0.010	<0.0033
1,1-Dichloroethane	µM	41	18	12	23	33	29	0.30	0.20	<0.0014	0.51	0.30	0.16	0.39
trans-1,2-Dichloroethene	µM	<0.014	<0.058	<0.0028	<0.11	<0.014	<0.058	<0.014	<0.028	<0.0028	0.035	<0.014	<0.029	<0.0041
1,2-Dichloroethane	µM	0.26	<0.038	<0.016	<0.10	0.20	<0.032	<0.0081	<0.016	<0.0016	0.088	<0.013	<0.016	<0.0046
1,1-Dichloroethene	µM	1.1	<0.099	<0.022	<0.093	0.50	1.3	<0.011	<0.022	<0.0022	<0.0019	<0.014	<0.022	<0.062
Chloroethane	µM	19	13	47	25	15	12	38	40	51	57	42	19	20
Ethane	µM	<0.20	<0.20	1.3	<0.33	<0.33	0.080	<0.20	<0.20	1.2	<0.20	<0.20	0.080	<0.043

Table 4 continued. Photocircuits Anaerobic Pilot Chlorinated Solvents in Micromolar Concentrations

Contaminant	Well	MW-8				MW-9			MW-12			
Date		3/28/01	7/12/01	1/8/02	4/3/02	3/28/01	7/12/01	1/8/02	3/28/01	7/12/01	1/9/02	4/3/02
Tetrachloroethene	µM	<0.00066	<0.0012	<0.00072	<0.0014	<0.00066	<0.0012	<0.0014	<0.00066	<0.0012	<0.0144	<0.014
Trichloroethene	µM	0.014	0.013	0.0074	<0.0012	<0.0015	<0.0013	<0.0012	0.93	0.0071	0.13	0.24
cis-1,2-Dichloroethene	µM	<0.0031	0.012	<0.0019	<0.022	<0.0031	<0.014	<0.0022	13.2	0.19	4.4	5.2
Vinyl Chloride	µM	<0.0040	<0.0011	<0.014	<0.0016	<0.0040	<0.0011	<0.0016	3.9	0.091	4.8	5.3
Ethene	µM	<0.21	<0.21	<0.046	<0.046	<0.21	<0.21		0.24	2.5	6.4	4.6
Acetylene	µM			<0.046	<0.046						<0.046	<0.046
1,1,1-Trichloroethane	µM	<0.0015	<0.0012	<0.0010	<0.0016	<0.0015	<0.0012	<0.0016	<0.0015	<0.0012	<0.0016	<0.016
1,1-Dichloroethane	µM	<0.0014	<0.0012	<0.0025	<0.0022	<0.0014	<0.0012	<0.0023	0.73	0.037	3.3	6.9
trans-1,2-Dichloroethene	µM	<0.0022	<0.0014	<0.0029	<0.0021	<0.0022	<0.0014	<0.0021	0.075	<0.0014	0.058	<0.021
1,2-Dichloroethane	µM	<0.0020	<0.0013	<0.0016	<0.0023	<0.0020	<0.0013	<0.0023	0.029	<0.0013	0.014	<0.023
1,1-Dichloroethene	µM	<0.0019	<0.0014	<0.0023	<0.0030	<0.0019	<0.0014	<0.0030	0.087	<0.0014	0.024	<0.0031
Chloroethane	µM	<0.0047	<0.0028	<0.010	<0.0095	<0.0047	<0.0028	<0.0095	<0.0047	<0.0047	0.095	<0.095
Ethane	µM	<0.20	<0.20	<0.043	<0.043	<0.20	<0.20		<0.20	0.43	0.73	0.37

Contaminant	Well	MW-13			
Date		3/28/01	7/12/01	1/10/02	4/3/02
Tetrachloroethene	µM	0.499	0.72	1.3	1.4
Trichloroethene	µM	0.65	0.87	1.6	1.0
cis-1,2-Dichloroethene	µM	8.1	9.3	20.1	10.2
Vinyl Chloride	µM	0.6	0.94	1.8	1.2
Ethene	µM	<0.21	<0.21	0.057	<0.046
Acetylene	µM			<0.046	<0.046
1,1,1-Trichloroethane	µM	0.30	0.28	0.24	0.15
1,1-Dichloroethane	µM	3.26	3.5	4.8	3.1
trans-1,2-Dichloroethene	µM	0.037	0.049	0.123	0.083
1,2-Dichloroethane	µM	0.026	0.023	0.028	<0.002
1,1-Dichloroethene	µM	0.63	0.62	0.78	0.45
Chloroethane	µM	<0.0047	<0.0025	<0.0095	<0.0095
Ethane	µM	0.19	0.22	0.77	0.29

Table 5. Photocircuits Anaerobic Pilot Field Data

Well		MW-7		SMP-1		DMP-1		SMP-3		DMP-3	
Well Depth	ft	23.2		9.1		19.04		14.6		24.35	
Well Diameter	inch	4		1		1		1		1	
Date		1/8/02	4/2/02	1/8/02	4/2/02	1/8/02	4/2/02	1/8/02	4/2/02	1/8/02	4/2/02
Water Level	ft	7.12		6.42		6.88		6.8		6.91	
pH		7.36	7.1	7.48	7.3	7.29		9.94	8.7	6.91	7.1
Temperature	°C	17.9	16.81	11.64	14.84	17.85		12.06	11.47	17.95	16.14
Spec. Conductivity	umhos/cm	4235	4100	2660	5250	5560		5550	5640	3200	3120
Redox Potential	mV	-53	-40	31	-130	-142		-44	-52	-120	-110
Dissolved Oxygen	mg/L	0.36	0.45	2.27	1.72	1.98		3.87	2.94	1.57	1.43
Bromide	mg/L				20		311		5		16

Well		SMP-4		DMP-4		MW-8		MW-9	MW-12	MW-13
Well Depth	ft	15.82		20.55		>102				
Well Diameter	inch	1		1		4				
Date		1/8/02	4/2/02	1/8/02	4/2/02	1/8/02	4/2/02	4/2/02	4/2/02	4/2/02
Water Level	ft	6.82		6.71		7.96				
pH		7.62	7.5	7.07	7.1	8.65	8.4	7.1	6.5	6.2
Temperature	°C	16.54	14.82	17.64	16.2	15.43	14.87	14.26	14.2	16.9
Spec. Conductivity	umhos/cm	5186	5130	2716	3140	183	190	200	4120	1520
Redox Potential	mV	-165	-170	-121	-80	240	270	250	-30	300
Dissolved Oxygen	mg/L	0.73	0.65	0.41	0.72	8.78	5.32	0.92	0.7	1.21
Bromide	mg/L				38		5.8		11	7.4

Table 6. Photocircuits Anaerobic Pilot Percent Change Between 9/1/00 and 1/8/02 or 4/2/02

Compound	MW-14	MW-7	SMP-1	DMP-1	SMP-3	DMP-3	SMP-4	DMP-4
Last Sampling Point	1/8/02	1/8/02	4/2/02	4/2/02	4/2/02	4/2/02	1/8/02	4/2/02
Acetone	-908			>100				
Methylene Chloride	-787	38	>94	>98	94	>96	77	46
Toluene	-733	85	>-506	98		64	40	11
2-Chlorotoluene		>-888		-143			>91	38
Sum VOAs (w/o gases)	-4529	-33	-136	96	87	45	28	48
Methane	-18195	-665	38	98	-1900	-887	-478	-33
Iron	-405	-490	8	95	83	41	77	40
Sulfate	92	-813	-117	93	-1173	-2	-75	-32
TOC	89	96	31	86	-444	-4	58	-64
PCE							-142	
TCE		>-218	>-78135	-3347				
cDCE		82	-71	98			>97	
VC	>-9786	73	62	98		62	28	
Ethene	-109	-75	14	71	-162	49	-55	40
1TCA	-10456				96	41	14	>99
1DCA	-11090	-58	28	-161	46	28	29	-30
1DCE	>-51519		>-605			90	-24	
CA	-3112	-51		98		65	36	48
Ethane	6	>-1033			8	-181	>60	

Table 7. Photocircuits Downgradient Wells Percent Change Between 3/28/00 and 1/8/02 or 4/2/02

Compound	MW-8	MW-9	MW-12	MW-13
Last Sampling Point	4/2/02	1/8/02	4/2/02	4/2/02
Acetone				
Methylene Chloride				
Toluene			-1075	
2-Chlorotoluene			-831	-71
Sum VOAs (w/o gases)	100		-147	-27
Methane			-298	-817
Iron	>-317		-12712	-41
Sulfate	-3		-178	39
TOC	72		-118	90
PCE				-174
TCE			75	-54
cDCE			61	-26
VC			-36	-92
Ethene			-1840	
1TCA				51
1DCA			-847	6
1DCE			64	28
CA				
Ethane			-83	28

Table 8. Summary of Changes in Concentrations of Chloroethenes, Chloroethanes, Electron Acceptors, and Electron Donor by Well

Well	Chlorinated Ethene Dechlorination	Chlorinated Ethane Dechlorination	Electron Acceptors	Electron Donor Availability
MW-14	Ethene predominant, VC increasing since March 2001. Not sampled 4/02 because of emulsion.	1TCA, 1DCA, 1DCE, and CA, increased between December 2000 and January 2002 as contaminated water displaced by emulsion moved back into well, ethane fairly stable.	Sulfate decreased by 92%, methane and iron up greatly.	TOC availability good. Emulsion found 4/02.
MW-7	Ethene generally predominant product, TCE up. cDCE and VC down by 82 and 73% from start of pilot. Not sampled 4/02 because of emulsion.	1DCA and CA up, CA major product. Ethane produced.	Sulfate increased from 69 to 949 mg/L from 7/11/01 to 1/8/02, methane and iron up greatly.	TOC had fallen to 1.7 mg/L in 1/02. Emulsion found 4/02.
SMP-1	TCE and cDCE up beginning in January 2002. VC and ethene down from start of pilot as substrate became limiting.	No 1TCA detected 4/2/02, 1DCA down, tDCE and 1DCE up, little CA or ethane.	Sulfate increasing, methane down from start of test, and iron relatively stable.	TOC rebounded to 63 mg/L in 4/02; should see enhanced dechlorination.
DMP-1	Both cDCE and VC decreased by 98% as of 4/2/02, ethene predominant product, but lower since December 2000.	1TCA non-detect 4/2/02, 1DCA up 161%, CA down by 98%, no ethane detected.	Sulfate down 93%, methane and iron also down.	TOC rebounded to 41 mg/L in 4/02, but still below optimal levels.
SMP-3	PCE, cDCE, and VC non-detect in April 2002, ethene predominant product and increasing.	1TCA down by 962%, 1DCA down 46%, little 1DCE, increasing CA, and some ethane.	Sulfate increased between March 2001 (54 mg/L) and April 2002 (3,640 mg/L), methane increasing, and iron variable.	TOC in April 2002 up to 1,600 mg/L.
DMP-3	PCE detected 7/11/01 and 1/8/02, but not 4/2/02. VC down 62%, ethene major product.	Although 1TCA, 1DCA, and CA rebounded between March and July 2001, overall trend is down. Ethane up slightly.	Sulfate stable, methane increasing, and iron decreasing.	TOC increased to 102 mg/L in 4/02.
SMP-4	PCE up, cDCE, and VC down, ethene increased. No data 4/02.	1TCA, 1DCA, and CA down, 1DCE rebounded, and little ethane .	Sulfate and methane increasing, and iron down.	Emulsion found 4/02.
DMP-4	No CE except ethene.	1TCA down 99, 1DCA up 30%, tDCE and 1DCE non-detect 4/2/02. CA predominant product, but decreasing, little ethane.	Sulfate up 32%, iron down, and methane increased.	TOC rebounded to 42 mg/L in April 2002, but still below optimal levels.

Table 8 continued. Summary of Changes in Concentrations of Chloroethenes, Chloroethanes, Electron Acceptors, and Electron Donor by Well

Well	Chlorinated Ethene Dechlorination	Chlorinated Ethane Dechlorination	Electron Acceptors	Electron Donor Availability
MW-8	TCE, cDCE, VC or ethene not detected 4/02.	No chlorinated ethanes or ethane detected.	Little sulfate, iron, or methane.	Little TOC available.
MW-9	No chlorinated ethenes or ethene detected.	No chlorinated ethanes or ethane detected.	Low sulfate, some methane and iron.	Little TOC available.
MW-12	TCE and cDCE decreasing, VC and ethene increasing	1DCA increasing, tDCE, 2DCA, and 1DCE not detected, CA and ethane detected.	Sulfate, iron, and methane increased.	TOC level increased to 73 mg/L in April 2002.
MW-13	Increases in PCE, TCE, cDCE, and VC concentrations, trace ethene.	Slight decreases in 1TCA, 1DCA, 1DCE, and ethane concentrations.	Methane increased, iron stable, and sulfate down 39%.	TOC levels increased from 0 in 1/02 to 15 mg/L in 4/02, but still below optimal.

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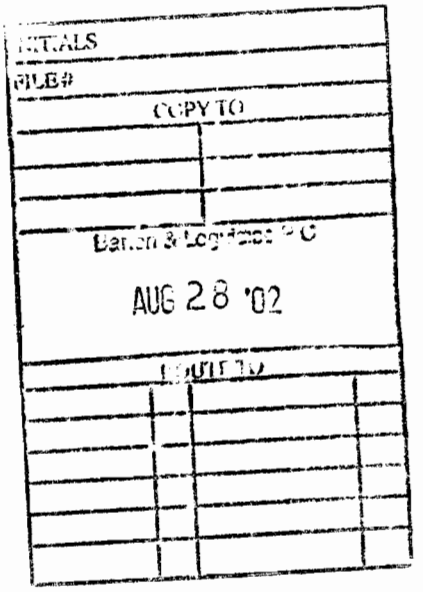
07/09/2002

Custody Document: M9235

Received: 06/26/2002 17:35
Sampled by: Dave Hanny /Bryce Dingman



Client: Photo Circuits

31 Sea Cliff Avenue
Glen Cove,
NY 11542

Project: Photocircuits Corp.

31 Sea Cliff Avenue
Glen Cove,
NY 11542

Manager: Charlie Nehrig

Respectfully submitted,

Laboratory Manager

NYS Lab ID # 10969
NJ Cert. # 73812
CT Cert. # PH0645
MA Cert. # NY061
PA Cert. # 68-535
NH Cert. # 252592-BA
RI Cert. # 161

Environmental Testing Laboratories, Inc.
208 Route 109, Farmingdale NY 11735
Phone - 631-249-1456 Fax - 631-249-8344

07/09/2002

Volatiles - EPA 8260B in AIR

Sample: M9235-12

Client Sample ID: 45A - INF
Collected: 06/26/2002 15:25
Matrix: Air
Type: Grab
Remarks:
Analyzed Date: 07/09/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2043	0.015	0.015	mg/M3	U
74-87-3	Chloromethane	C 587 -2043	0.010	0.010	mg/M3	U
75-01-4	Vinyl Chloride	C 587 -2043	0.010	0.010	mg/M3	U
74-83-9	Bromomethane	C 587 -2043	0.015	0.015	mg/M3	U
75-00-3	Chloroethane	C 587 -2043	0.017	0.017	mg/M3	U
75-69-4	Trichlorofluoromethane	C 587 -2043	0.0047	0.0047	mg/M3	U
75-35-4	1,1-Dichloroethene	C 587 -2043	0.0069	0.0069	mg/M3	U
75-09-2	Methylene Chloride	C 587 -2043	0.034	0.034	mg/M3	U
156-60-5	t-1,2-Dichloroethene	C 587 -2043	0.010	0.010	mg/M3	U
75-34-3	1,1-Dichloroethane	C 587 -2043	0.011	0.011	mg/M3	U
590-20-7	2,2-Dichloropropane	C 587 -2043	0.0074	0.0074	mg/M3	U
156-59-2	c-1,2-Dichloroethene	C 587 -2043	0.010	**1.15**	mg/M3	
67-66-3	Chloroform	C 587 -2043	0.0064	0.0064	mg/M3	U
74-97-5	Bromochloromethane	C 587 -2043	0.014	0.014	mg/M3	U
71-55-6	1,1,1-Trichloroethane	C 587 -2043	0.0076	0.0076	mg/M3	U
563-58-6	1,1-Dichloropropene	C 587 -2043	0.027	0.027	mg/M3	U
56-23-5	Carbon Tetrachloride	C 587 -2043	0.0074	0.0074	mg/M3	U
107-06-2	1,2 Dichloroethane	C 587 -2043	0.012	0.012	mg/M3	U
71-43-2	Benzene	C 587 -2043	0.0054	0.0054	mg/M3	U
79-01-6	Trichloroethene	C 587 -2043	0.0084	**13.5**	mg/M3	
78-87-5	1,2-Dichloropropane	C 587 -2043	0.0066	0.0066	mg/M3	U
75-27-4	Bromodichloromethane	C 587 -2043	0.0039	0.0039	mg/M3	U
74-95-3	Dibromomethane	C 587 -2043	0.0057	0.0057	mg/M3	U
10061-01-5	c-1,3-Dichloropropene	C 587 -2043	0.020	0.020	mg/M3	U
108-88-3	Toluene	C 587 -2043	0.0052	0.0052	mg/M3	U
10061-02-6	t-1,3-Dichloropropene	C 587 -2043	0.019	0.019	mg/M3	U
79-00-5	1,1,2-Trichloroethane	C 587 -2043	0.0042	0.0042	mg/M3	U
142-28-9	1,3-Dichloropropane	C 587 -2043	0.0076	0.0076	mg/M3	U
127-18-4	Tetrachloroethene	C 590 -2111	0.042	**962**	mg/M3	
124-48-1	Dibromochloromethane	C 587 -2043	0.0044	0.0044	mg/M3	U
106-93-4	1,2-Dibromoethane	C 587 -2043	0.0042	0.0042	mg/M3	U
108-90-7	Chlorobenzene	C 587 -2043	0.0039	0.0039	mg/M3	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2043	0.0047	0.0047	mg/M3	U
100-41-4	Ethylbenzene	C 587 -2043	0.0042	0.0042	mg/M3	U
108-38-3	m,p-xylene	C 587 -2043	0.0064	0.0064	mg/M3	U
95-47-6	o-xylene	C 587 -2043	0.0052	0.0052	mg/M3	U

Environmental Testing Laboratories, Inc.

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07/09/2002

Volatiles - EPA 8260B in AIR

Sample: M9235-12...continue

Client Sample ID: 45A - INF

Collected: 06/26/2002 15:25

Matrix: Air

Type: Grab

Remarks:

Analyzed Date: 07/09/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
100-42-5	Styrene	C 587 -2043	0.0030	0.0030	mg/M3	U
98-82-8	Isopropylbenzene	C 587 -2043	0.0025	0.0025	mg/M3	U
75-25-2	Bromoform	C 587 -2043	0.0054	0.0054	mg/M3	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2043	0.0079	0.0079	mg/M3	U
96-18-4	1,2,3-Trichloropropane	C 587 -2043	0.018	0.018	mg/M3	U
103-65-1	n-Propylbenzene	C 587 -2043	0.0054	0.0054	mg/M3	U
108-86-1	Bromobenzene	C 587 -2043	0.0074	0.0074	mg/M3	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2043	0.0042	0.0042	mg/M3	U
95-49-8	2-Chlorotoluene	C 587 -2043	0.0049	0.0049	mg/M3	U
106-43-4	4-Chlorotoluene	C 587 -2043	0.0079	0.0079	mg/M3	U
99-87-6	4-Isopropyltoluene	C 587 -2043	0.0037	0.0037	mg/M3	U
95-63-6	1,2,4-trimethylbenzene	C 587 -2043	0.0039	0.0039	mg/M3	U
135-98-8	sec-Butylbenzene	C 587 -2043	0.0049	0.0049	mg/M3	U
98-06-6	tert-Butylbenzene	C 587 -2043	0.0037	0.0037	mg/M3	U
541-73-1	1,3 Dichlorobenzene	C 587 -2043	0.0047	0.0047	mg/M3	U
106-46-7	1,4-Dichlorobenzene	C 587 -2043	0.0059	0.0059	mg/M3	U
104-51-8	n-Butylbenzene	C 587 -2043	0.0054	0.0054	mg/M3	U
95-50-1	1,2-Dichlorobenzene	C 587 -2043	0.0027	0.0027	mg/M3	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2043	0.0059	0.0059	mg/M3	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2043	0.0059	0.0059	mg/M3	U
87-68-3	Hexachlorobutadiene	C 587 -2043	0.0030	0.0030	mg/M3	U
91-20-3	Naphthalene	C 587 -2043	0.0052	0.0052	mg/M3	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2043	0.021	0.021	mg/M3	U
1634-04-4	MTBE	C 587 -2043	0.015	0.015	mg/M3	U

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2043	101.0 %	(77- 123)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2043	102.0 %	(62- 138)	
2037-26-5	TOLUENE-D8	C587-2043	98.2 %	(73- 127)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2111	103.0 %	(77- 123)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2111	96.9 %	(62- 138)	
2037-26-5	TOLUENE-D8	C590-2111	101.0 %	(73- 127)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-1

Client Sample ID: SMP - 1
Collected: 06/25/2002 17:00
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2032	19.0	19.0	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2032	12.5	12.5	ppb	U
74-87-3	Chloromethane	C 587 -2032	16.0	16.0	ppb	U
75-01-4	Vinyl Chloride	C 590 -2101	46.0	**8920**	ppb	
74-83-9	Bromomethane	C 587 -2032	16.0	16.0	ppb	U
75-00-3	Chloroethane	C 587 -2032	12.0	12.0	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2032	13.5	13.5	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2032	18.0	18.0	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2032	13.5	**50.5**	ppb	
67-64-1	Acetone	C 587 -2032	56.5	56.5	ppb	U
75-15-0	Carbon disulfide	C 587 -2032	9.50	9.50	ppb	U
75-09-2	Methylene Chloride	C 587 -2032	10.5	10.5	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2032	15.5	15.5	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2032	9.00	9.00	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2032	15.0	**295**	ppb	
590-20-7	2,2-Dichloropropane	C 587 -2032	13.5	13.5	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 590 -2101	48.0	**25700**	ppb	
78-93-3	2-Butanone	C 587 -2032	190	190	ppb	U
74-97-5	Bromochloromethane	C 587 -2032	12.5	12.5	ppb	U
67-66-3	Chloroform	C 587 -2032	13.0	13.0	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2032	13.0	13.0	ppb	U
56-23-5	Carbon Tetrachloride	C 587 -2032	11.0	11.0	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2032	19.5	19.5	ppb	U
71-43-2	Benzene	C 587 -2032	10.5	10.5	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2032	11.5	11.5	ppb	U
79-01-6	Trichloroethene	C 587 -2032	18.0	**41.0**	ppb	
78-87-5	1,2-Dichloropropane	C 587 -2032	15.5	15.5	ppb	U
74-95-3	Dibromomethane	C 587 -2032	12.0	12.0	ppb	U
75-27-4	Bromodichloromethane	C 587 -2032	10.0	10.0	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2032	16.5	16.5	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2032	8.00	8.00	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2032	31.5	31.5	ppb	U
108-88-3	Toluene	C 587 -2032	10.0	**114**	ppb	
10061-02-6	trans-1,3-Dichloropropene	C 587 -2032	8.00	8.00	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2032	8.00	8.00	ppb	U
127-18-4	Tetrachloroethene	C 587 -2032	5.50	5.50	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-1...continue
Client Sample ID: SMP - 1
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/25/2002 17:00

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2032	10.5	10.5	ppb	U
591-78-6	2-Hexanone	C 587 -2032	47.0	47.0	ppb	U
124-48-1	Dibromochloromethane	C 587 -2032	6.50	6.50	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2032	8.50	8.50	ppb	U
108-90-7	Chlorobenzene	C 587 -2032	7.50	7.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2032	10.0	10.0	ppb	U
100-41-4	Ethylbenzene	C 587 -2032	11.0	11.0	ppb	U
108-38-3	m,p-xylene	C 587 -2032	17.0	17.0	ppb	U
95-47-6	o-xylene	C 587 -2032	12.5	12.5	ppb	U
100-42-5	Styrene	C 587 -2032	10.0	10.0	ppb	U
75-25-2	Bromoform	C 587 -2032	10.5	10.5	ppb	U
98-82-8	Isopropylbenzene	C 587 -2032	7.50	7.50	ppb	U
108-86-1	Bromobenzene	C 587 -2032	10.0	10.0	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2032	11.5	11.5	ppb	U
103-65-1	n-Propylbenzene	C 587 -2032	8.00	8.00	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2032	17.5	17.5	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2032	8.00	8.00	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2032	10.0	10.0	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2032	12.5	12.5	ppb	U
106-43-4	4-Chlorotoluene	C 587 -2032	11.0	11.0	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2032	9.50	9.50	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2032	8.50	8.50	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2032	11.0	11.0	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2032	8.50	8.50	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2032	8.50	8.50	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2032	5.00	5.00	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2032	5.50	5.50	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2032	11.0	11.0	ppb	U
104-51-8	n-Butylbenzene	C 587 -2032	8.50	8.50	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2032	25.0	25.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2032	21.0	21.0	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2032	6.50	6.50	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2032	22.5	22.5	ppb	U
91-20-3	Naphthalene	C 587 -2032	14.5	14.5	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2032	9.50	9.50	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-1...continue

Client Sample ID: SMP - 1
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/25/2002 17:00

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2032	99.2 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2032	97.7 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C587-2032	102.0 %	(90 - 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2101	102.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2101	97.7 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C590-2101	103.0 %	(90 - 111)	

Environmental Testing Laboratories, Inc.

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-2

Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 590 -2102	0.38	0.38	ppb	U
75-45-6	Chlorodifluoromethane	C 590 -2102	0.25	0.25	ppb	U
74-87-3	Chloromethane	C 590 -2102	0.32	0.32	ppb	U
75-01-4	Vinyl Chloride	C 590 -2102	0.23	**25.4**	ppb	
74-83-9	Bromomethane	C 590 -2102	0.32	0.32	ppb	U
75-00-3	Chloroethane	C 590 -2102	0.24	**36.9**	ppb	
75-69-4	Trichlorofluoromethane	C 590 -2102	0.27	0.27	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 590 -2102	0.36	0.36	ppb	U
75-35-4	1,1-Dichloroethene	C 590 -2102	0.27	0.27	ppb	U
67-64-1	Acetone	C 590 -2102	1.13	**48.8**	ppb	
75-15-0	Carbon disulfide	C 590 -2102	0.19	0.19	ppb	U
75-09-2	Methylene Chloride	C 590 -2102	0.21	**1.70**	ppb	
156-60-5	trans-1,2-Dichloroethene	C 590 -2102	0.31	**2.80**	ppb	
1634-04-4	Methyl t-butyl ether	C 590 -2102	0.18	0.18	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2033	15.0	**412**	ppb	
590-20-7	2,2-Dichloropropane	C 590 -2102	0.27	0.27	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 590 -2102	0.24	**62.1**	ppb	
78-93-3	2-Butanone	C 590 -2102	3.80	3.80	ppb	U
74-97-5	Bromochloromethane	C 590 -2102	0.25	0.25	ppb	U
67-66-3	Chloroform	C 590 -2102	0.26	0.26	ppb	U
71-55-6	1,1,1-Trichloroethane	C 590 -2102	0.26	**0.89**	ppb	
56-23-5	Carbon Tetrachloride	C 590 -2102	0.22	0.22	ppb	U
563-58-6	1,1-Dichloropropene	C 590 -2102	0.39	0.39	ppb	U
71-43-2	Benzene	C 590 -2102	0.21	0.21	ppb	U
107-06-2	1,2-Dichloroethane	C 590 -2102	0.23	**2.90**	ppb	
79-01-6	Trichloroethene	C 590 -2102	0.36	**10.5**	ppb	
78-87-5	1,2-Dichloropropane	C 590 -2102	0.31	0.31	ppb	U
74-95-3	Dibromomethane	C 590 -2102	0.24	0.24	ppb	U
75-27-4	Bromodichloromethane	C 590 -2102	0.20	0.20	ppb	U
110-75-8	2-Chloroethylvinylether	C 590 -2102	0.33	0.33	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 590 -2102	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	C 590 -2102	0.63	0.63	ppb	U
108-88-3	Toluene	C 590 -2102	0.20	**5.80**	ppb	
10061-02-6	trans-1,3-Dichloropropene	C 590 -2102	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	C 590 -2102	0.16	0.16	ppb	U
127-18-4	Tetrachloroethene	C 590 -2102	0.11	**1.10**	ppb	

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Volatile Compounds - EPA 8260B

Sample: M9235-2...continue

Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 590 -2102	0.21	0.21	ppb	U
591-78-6	2-Hexanone	C 590 -2102	0.94	0.94	ppb	U
124-48-1	Dibromochloromethane	C 590 -2102	0.13	0.13	ppb	U
106-93-4	1,2-Dibromoethane	C 590 -2102	0.17	0.17	ppb	U
108-90-7	Chlorobenzene	C 590 -2102	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 590 -2102	0.20	0.20	ppb	U
100-41-4	Ethylbenzene	C 590 -2102	0.22	0.22	ppb	U
108-38-3	m,p-xylene	C 590 -2102	0.34	**0.92**	ppb	
95-47-6	o-xylene	C 590 -2102	0.25	**0.82**	ppb	
100-42-5	Styrene	C 590 -2102	0.20	0.20	ppb	U
75-25-2	Bromoform	C 590 -2102	0.21	0.21	ppb	U
98-82-8	Isopropylbenzene	C 590 -2102	0.15	0.15	ppb	U
108-86-1	Bromobenzene	C 590 -2102	0.20	0.20	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 590 -2102	0.23	0.23	ppb	U
103-65-1	n-Propylbenzene	C 590 -2102	0.16	0.16	ppb	U
96-18-4	1,2,3-Trichloropropane	C 590 -2102	0.35	0.35	ppb	U
622-96-8	p-Ethyltoluene	C 590 -2102	0.16	**1.40**	ppb	
108-67-8	1,3,5-Trimethylbenzene	C 590 -2102	0.20	**1.30**	ppb	
95-49-8	2-Chlorotoluene	C 590 -2102	0.25	**30.1**	ppb	
106-43-4	4-Chlorotoluene	C 590 -2102	0.22	0.22	ppb	U
98-06-6	tert-Butylbenzene	C 590 -2102	0.19	0.19	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 590 -2102	0.17	**3.20**	ppb	
135-98-8	sec-Butylbenzene	C 590 -2102	0.22	0.22	ppb	U
99-87-6	p-Isopropyltoluene	C 590 -2102	0.17	0.17	ppb	U
541-73-1	1,3-Dichlorobenzene	C 590 -2102	0.17	0.17	ppb	U
106-46-7	1,4-Dichlorobenzene	C 590 -2102	0.10	0.10	ppb	U
95-50-1	1,2-Dichlorobenzene	C 590 -2102	0.11	0.11	ppb	U
105-05-5	p-Diethylbenzene	C 590 -2102	0.22	0.22	ppb	U
104-51-8	n-Butylbenzene	C 590 -2102	0.17	0.17	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 590 -2102	0.50	0.50	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 590 -2102	0.42	0.42	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 590 -2102	0.13	0.13	ppb	U
87-68-3	Hexachlorobutadiene	C 590 -2102	0.45	0.45	ppb	U
91-20-3	Naphthalene	C 590 -2102	0.29	0.29	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 590 -2102	0.19	0.19	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-2...continue
Client Sample ID: DMP - 1
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/25/2002 17:15

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2033	100.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2033	94.5 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C587-2033	101.0 %	(90 - 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2102	101.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2102	98.9 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C590-2102	103.0 %	(90 - 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-3

Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2034	19.0	19.0	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2034	12.5	12.5	ppb	U
74-87-3	Chloromethane	C 587 -2034	16.0	16.0	ppb	U
75-01-4	Vinyl Chloride	C 587 -2034	11.5	**118**	ppb	
74-83-9	Bromomethane	C 587 -2034	16.0	16.0	ppb	U
75-00-3	Chloroethane	C 587 -2034	12.0	**354**	ppb	
75-69-4	Trichlorofluoromethane	C 587 -2034	13.5	13.5	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2034	18.0	18.0	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2034	13.5	**112**	ppb	
67-64-1	Acetone	C 587 -2034	56.5	56.5	ppb	U
75-15-0	Carbon disulfide	C 587 -2034	9.50	9.50	ppb	U
75-09-2	Methylene Chloride	C 587 -2034	10.5	10.5	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2034	15.5	15.5	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2034	9.00	9.00	ppb	U
75-34-3	1,1-Dichloroethane	C 590 -2103	60.0	**10800**	ppb	
590-20-7	2,2-Dichloropropane	C 587 -2034	13.5	13.5	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2034	12.0	12.0	ppb	U
78-93-3	2-Butanone	C 587 -2034	190	190	ppb	U
74-97-5	Bromochloromethane	C 587 -2034	12.5	12.5	ppb	U
67-66-3	Chloroform	C 587 -2034	13.0	13.0	ppb	U
71-55-6	1,1,1-Trichloroethane	C 590 -2103	52.0	**8070**	ppb	
56-23-5	Carbon Tetrachloride	C 587 -2034	11.0	11.0	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2034	19.5	19.5	ppb	U
71-43-2	Benzene	C 587 -2034	10.5	10.5	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2034	11.5	11.5	ppb	U
79-01-6	Trichloroethene	C 587 -2034	18.0	18.0	ppb	U
78-87-5	1,2-Dichloropropane	C 587 -2034	15.5	15.5	ppb	U
74-95-3	Dibromomethane	C 587 -2034	12.0	12.0	ppb	U
75-27-4	Bromodichloromethane	C 587 -2034	10.0	10.0	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2034	16.5	16.5	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2034	8.00	8.00	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2034	31.5	31.5	ppb	U
108-88-3	Toluene	C 587 -2034	10.0	**76.0**	ppb	
10061-02-6	trans-1,3-Dichloropropene	C 587 -2034	8.00	8.00	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2034	8.00	8.00	ppb	U
127-18-4	Tetrachloroethene	C 587 -2034	5.50	5.50	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-3...continue

Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2034	10.5	10.5	ppb	U
591-78-6	2-Hexanone	C 587 -2034	47.0	47.0	ppb	U
124-48-1	Dibromochloromethane	C 587 -2034	6.50	6.50	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2034	8.50	8.50	ppb	U
108-90-7	Chlorobenzene	C 587 -2034	7.50	7.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2034	10.0	10.0	ppb	U
100-41-4	Ethylbenzene	C 587 -2034	11.0	11.0	ppb	U
108-38-3	m,p-xylene	C 587 -2034	17.0	17.0	ppb	U
95-47-6	o-xylene	C 587 -2034	12.5	12.5	ppb	U
100-42-5	Styrene	C 587 -2034	10.0	10.0	ppb	U
75-25-2	Bromoform	C 587 -2034	10.5	10.5	ppb	U
98-82-8	Isopropylbenzene	C 587 -2034	7.50	7.50	ppb	U
108-86-1	Bromobenzene	C 587 -2034	10.0	10.0	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2034	11.5	11.5	ppb	U
103-65-1	n-Propylbenzene	C 587 -2034	8.00	8.00	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2034	17.5	17.5	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2034	8.00	8.00	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2034	10.0	10.0	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2034	12.5	12.5	ppb	U
106-43-4	4-Chlorotoluene	C 587 -2034	11.0	11.0	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2034	9.50	9.50	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2034	8.50	8.50	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2034	11.0	11.0	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2034	8.50	8.50	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2034	8.50	8.50	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2034	5.00	5.00	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2034	5.50	5.50	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2034	11.0	11.0	ppb	U
104-51-8	n-Butylbenzene	C 587 -2034	8.50	8.50	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2034	25.0	25.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2034	21.0	21.0	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2034	6.50	6.50	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2034	22.5	22.5	ppb	U
91-20-3	Naphthalene	C 587 -2034	14.5	14.5	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2034	9.50	9.50	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-3...continue

Client Sample ID: SMP - 3
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/25/2002 17:45

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2034	99.3 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2034	97.2 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C587-2034	102.0 %	(90 - 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2103	102.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2103	96.6 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C590-2103	102.0 %	(90 - 111)	

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Volatile Compounds - EPA 8260B

Sample: M9235-4

Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 590 -2104	7.60	7.60	ppb	U
75-45-6	Chlorodifluoromethane	C 590 -2104	5.00	5.00	ppb	U
74-87-3	Chloromethane	C 590 -2104	6.40	6.40	ppb	U
75-01-4	Vinyl Chloride	C 590 -2104	4.60	**113**	ppb	
74-83-9	Bromomethane	C 590 -2104	6.40	6.40	ppb	U
75-00-3	Chloroethane	C 587 -2035	24.0	**10100**	ppb	
75-69-4	Trichlorofluoromethane	C 590 -2104	5.40	5.40	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 590 -2104	7.20	7.20	ppb	U
75-35-4	1,1-Dichloroethene	C 590 -2104	5.40	**17.4**	ppb	
67-64-1	Acetone	C 590 -2104	22.6	**945**	ppb	
75-15-0	Carbon disulfide	C 590 -2104	3.80	3.80	ppb	U
75-09-2	Methylene Chloride	C 590 -2104	4.20	**91.8**	ppb	
156-60-5	trans-1,2-Dichloroethene	C 590 -2104	6.20	6.20	ppb	U
1634-04-4	Methyl t-butyl ether	C 590 -2104	3.60	**26.6**	ppb	
75-34-3	1,1-Dichloroethane	C 590 -2104	6.00	**2410**	ppb	
590-20-7	2,2-Dichloropropane	C 590 -2104	5.40	5.40	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 590 -2104	4.80	4.80	ppb	U
78-93-3	2-Butanone	C 590 -2104	76.0	76.0	ppb	U
74-97-5	Bromochloromethane	C 590 -2104	5.00	5.00	ppb	U
67-66-3	Chloroform	C 590 -2104	5.20	5.20	ppb	U
71-55-6	1,1,1-Trichloroethane	C 590 -2104	5.20	**1350**	ppb	
56-23-5	Carbon Tetrachloride	C 590 -2104	4.40	4.40	ppb	U
563-58-6	1,1-Dichloropropene	C 590 -2104	7.80	7.80	ppb	U
71-43-2	Benzene	C 590 -2104	4.20	4.20	ppb	U
107-06-2	1,2-Dichloroethane	C 590 -2104	4.60	**36.6**	ppb	
79-01-6	Trichloroethene	C 590 -2104	7.20	7.20	ppb	U
78-87-5	1,2-Dichloropropane	C 590 -2104	6.20	6.20	ppb	U
74-95-3	Dibromomethane	C 590 -2104	4.80	4.80	ppb	U
75-27-4	Bromodichloromethane	C 590 -2104	4.00	4.00	ppb	U
110-75-8	2-Chloroethylvinylether	C 590 -2104	6.60	6.60	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 590 -2104	3.20	3.20	ppb	U
108-10-1	4-Methyl-2-pentanone	C 590 -2104	12.6	12.6	ppb	U
108-88-3	Toluene	C 590 -2104	4.00	**85.6**	ppb	
10061-02-6	trans-1,3-Dichloropropene	C 590 -2104	3.20	3.20	ppb	U
79-00-5	1,1,2-Trichloroethane	C 590 -2104	3.20	3.20	ppb	U
127-18-4	Tetrachloroethene	C 590 -2104	2.20	2.20	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-4...continue

Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 590 -2104	4.20	4.20	ppb	U
591-78-6	2-Hexanone	C 590 -2104	18.8	18.8	ppb	U
124-48-1	Dibromochloromethane	C 590 -2104	2.60	2.60	ppb	U
106-93-4	1,2-Dibromoethane	C 590 -2104	3.40	3.40	ppb	U
108-90-7	Chlorobenzene	C 590 -2104	3.00	3.00	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 590 -2104	4.00	4.00	ppb	U
100-41-4	Ethylbenzene	C 590 -2104	4.40	4.40	ppb	U
108-38-3	m,p-xylene	C 590 -2104	6.80	6.80	ppb	U
95-47-6	o-xylene	C 590 -2104	5.00	5.00	ppb	U
100-42-5	Styrene	C 590 -2104	4.00	4.00	ppb	U
75-25-2	Bromoform	C 590 -2104	4.20	4.20	ppb	U
98-82-8	Isopropylbenzene	C 590 -2104	3.00	3.00	ppb	U
108-86-1	Bromobenzene	C 590 -2104	4.00	4.00	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 590 -2104	4.60	4.60	ppb	U
103-65-1	n-Propylbenzene	C 590 -2104	3.20	3.20	ppb	U
96-18-4	1,2,3-Trichloropropane	C 590 -2104	7.00	7.00	ppb	U
622-96-8	p-Ethyltoluene	C 590 -2104	3.20	3.20	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 590 -2104	4.00	4.00	ppb	U
95-49-8	2-Chlorotoluene	C 590 -2104	5.00	5.00	ppb	U
106-43-4	4-Chlorotoluene	C 590 -2104	4.40	4.40	ppb	U
98-06-6	tert-Butylbenzene	C 590 -2104	3.80	3.80	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 590 -2104	3.40	3.40	ppb	U
135-98-8	sec-Butylbenzene	C 590 -2104	4.40	4.40	ppb	U
99-87-6	p-Isopropyltoluene	C 590 -2104	3.40	3.40	ppb	U
541-73-1	1,3-Dichlorobenzene	C 590 -2104	3.40	3.40	ppb	U
106-46-7	1,4-Dichlorobenzene	C 590 -2104	2.00	2.00	ppb	U
95-50-1	1,2-Dichlorobenzene	C 590 -2104	2.20	2.20	ppb	U
105-05-5	p-Diethylbenzene	C 590 -2104	4.40	4.40	ppb	U
104-51-8	n-Butylbenzene	C 590 -2104	3.40	3.40	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 590 -2104	10.0	10.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 590 -2104	8.40	8.40	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 590 -2104	2.60	2.60	ppb	U
87-68-3	Hexachlorobutadiene	C 590 -2104	9.00	9.00	ppb	U
91-20-3	Naphthalene	C 590 -2104	5.80	5.80	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 590 -2104	3.80	3.80	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-4...continue

Client Sample ID: DMP - 3

Matrix: Liquid

Type: Grab

Collected: 06/25/2002 17:30

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2035	100.0 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2035	95.9 %	(83- 113)	
2037-26-5	TOLUENE-D8	C587-2035	102.0 %	(90- 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2104	102.0 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2104	97.6 %	(83- 113)	
2037-26-5	TOLUENE-D8	C590-2104	102.0 %	(90- 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-5

Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 590 -2105	0.76	0.76	ppb	U
75-45-6	Chlorodifluoromethane	C 590 -2105	0.50	0.50	ppb	U
74-87-3	Chloromethane	C 590 -2105	0.64	0.64	ppb	U
75-01-4	Vinyl Chloride	C 590 -2105	0.46	**4.90**	ppb	
74-83-9	Bromomethane	C 590 -2105	0.64	0.64	ppb	U
75-00-3	Chloroethane	C 590 -2105	0.48	**147**	ppb	
75-69-4	Trichlorofluoromethane	C 590 -2105	0.54	0.54	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 590 -2105	0.72	0.72	ppb	U
75-35-4	1,1-Dichloroethene	C 590 -2105	0.54	0.54	ppb	U
67-64-1	Acetone	C 587 -2036	56.5	**365**	ppb	
75-15-0	Carbon disulfide	C 590 -2105	0.38	0.38	ppb	U
75-09-2	Methylene Chloride	C 590 -2105	0.42	**7.50**	ppb	
156-60-5	trans-1,2-Dichloroethene	C 590 -2105	0.62	0.62	ppb	U
1634-04-4	Methyl t-butyl ether	C 590 -2105	0.36	0.36	ppb	U
75-34-3	1,1-Dichloroethane	C 590 -2105	0.60	**135**	ppb	
590-20-7	2,2-Dichloropropane	C 590 -2105	0.54	0.54	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 590 -2105	0.48	**30.0**	ppb	
78-93-3	2-Butanone	C 590 -2105	7.60	7.60	ppb	U
74-97-5	Bromochloromethane	C 590 -2105	0.50	0.50	ppb	U
67-66-3	Chloroform	C 590 -2105	0.52	0.52	ppb	U
71-55-6	1,1,1-Trichloroethane	C 590 -2105	0.52	**23.0**	ppb	
56-23-5	Carbon Tetrachloride	C 590 -2105	0.44	0.44	ppb	U
563-58-6	1,1-Dichloropropene	C 590 -2105	0.78	0.78	ppb	U
71-43-2	Benzene	C 590 -2105	0.42	0.42	ppb	U
107-06-2	1,2-Dichloroethane	C 590 -2105	0.46	0.46	ppb	U
79-01-6	Trichloroethene	C 590 -2105	0.72	**6.50**	ppb	
78-87-5	1,2-Dichloropropane	C 590 -2105	0.62	0.62	ppb	U
74-95-3	Dibromomethane	C 590 -2105	0.48	0.48	ppb	U
75-27-4	Bromodichloromethane	C 590 -2105	0.40	0.40	ppb	U
110-75-8	2-Chloroethylvinylether	C 590 -2105	0.66	0.66	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 590 -2105	0.32	0.32	ppb	U
108-10-1	4-Methyl-2-pentanone	C 590 -2105	1.26	1.26	ppb	U
108-88-3	Toluene	C 590 -2105	0.40	0.40	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 590 -2105	0.32	0.32	ppb	U
79-00-5	1,1,2-Trichloroethane	C 590 -2105	0.32	0.32	ppb	U
127-18-4	Tetrachloroethene	C 590 -2105	0.22	**70.2**	ppb	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-5...continue

Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 590 -2105	0.42	0.42	ppb	U
591-78-6	2-Hexanone	C 590 -2105	1.88	1.88	ppb	U
124-48-1	Dibromochloromethane	C 590 -2105	0.26	0.26	ppb	U
106-93-4	1,2-Dibromoethane	C 590 -2105	0.34	0.34	ppb	U
108-90-7	Chlorobenzene	C 590 -2105	0.30	0.30	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 590 -2105	0.40	0.40	ppb	U
100-41-4	Ethylbenzene	C 590 -2105	0.44	0.44	ppb	U
108-38-3	m,p-xylene	C 590 -2105	0.68	0.68	ppb	U
95-47-6	o-xylene	C 590 -2105	0.50	0.50	ppb	U
100-42-5	Styrene	C 590 -2105	0.40	0.40	ppb	U
75-25-2	Bromoform	C 590 -2105	0.42	0.42	ppb	U
98-82-8	Isopropylbenzene	C 590 -2105	0.30	0.30	ppb	U
108-86-1	Bromobenzene	C 590 -2105	0.40	0.40	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 590 -2105	0.46	0.46	ppb	U
103-65-1	n-Propylbenzene	C 590 -2105	0.32	0.32	ppb	U
96-18-4	1,2,3-Trichloropropane	C 590 -2105	0.70	0.70	ppb	U
622-96-8	p-Ethyltoluene	C 590 -2105	0.32	0.32	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 590 -2105	0.40	0.40	ppb	U
95-49-8	2-Chlorotoluene	C 590 -2105	0.50	0.50	ppb	U
106-43-4	4-Chlorotoluene	C 590 -2105	0.44	0.44	ppb	U
98-06-6	tert-Butylbenzene	C 590 -2105	0.38	0.38	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 590 -2105	0.34	0.34	ppb	U
135-98-8	sec-Butylbenzene	C 590 -2105	0.44	0.44	ppb	U
99-87-6	p-Isopropyltoluene	C 590 -2105	0.34	0.34	ppb	U
541-73-1	1,3-Dichlorobenzene	C 590 -2105	0.34	0.34	ppb	U
106-46-7	1,4-Dichlorobenzene	C 590 -2105	0.20	0.20	ppb	U
95-50-1	1,2-Dichlorobenzene	C 590 -2105	0.22	0.22	ppb	U
105-05-5	p-Diethylbenzene	C 590 -2105	0.44	0.44	ppb	U
104-51-8	n-Butylbenzene	C 590 -2105	0.34	0.34	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 590 -2105	1.00	1.00	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 590 -2105	0.84	0.84	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 590 -2105	0.26	0.26	ppb	U
87-68-3	Hexachlorobutadiene	C 590 -2105	0.90	0.90	ppb	U
91-20-3	Naphthalene	C 590 -2105	0.58	0.58	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 590 -2105	0.38	0.38	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-5...continue

Client Sample ID: SMP - 4

Matrix: Liquid

Type: Grab

Collected: 06/25/2002 18:30

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2036	100.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2036	94.5 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C587-2036	101.0 %	(90 - 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2105	100.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2105	96.4 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C590-2105	102.0 %	(90 - 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-6

Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 590 -2106	1.90	1.90	ppb	U
75-45-6	Chlorodifluoromethane	C 590 -2106	1.25	1.25	ppb	U
74-87-3	Chloromethane	C 590 -2106	1.60	1.60	ppb	U
75-01-4	Vinyl Chloride	C 590 -2106	1.15	1.15	ppb	U
74-83-9	Bromomethane	C 590 -2106	1.60	1.60	ppb	U
75-00-3	Chloroethane	C 587 -2037	12.0	**1330**	ppb	
75-69-4	Trichlorofluoromethane	C 590 -2106	1.35	1.35	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 590 -2106	1.80	1.80	ppb	U
75-35-4	1,1-Dichloroethene	C 590 -2106	1.35	1.35	ppb	U
67-64-1	Acetone	C 590 -2106	5.65	5.65	ppb	U
75-15-0	Carbon disulfide	C 590 -2106	0.95	0.95	ppb	U
75-09-2	Methylene Chloride	C 590 -2106	1.05	**22.2**	ppb	
156-60-5	trans-1,2-Dichloroethene	C 590 -2106	1.55	1.55	ppb	U
1634-04-4	Methyl t-butyl ether	C 590 -2106	0.90	0.90	ppb	U
75-34-3	1,1-Dichloroethane	C 590 -2106	1.50	**78.1**	ppb	
590-20-7	2,2-Dichloropropane	C 590 -2106	1.35	1.35	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 590 -2106	1.20	1.20	ppb	U
78-93-3	2-Butanone	C 590 -2106	19.0	19.0	ppb	U
74-97-5	Bromochloromethane	C 590 -2106	1.25	1.25	ppb	U
67-66-3	Chloroform	C 590 -2106	1.30	1.30	ppb	U
71-55-6	1,1,1-Trichloroethane	C 590 -2106	1.30	1.30	ppb	U
56-23-5	Carbon Tetrachloride	C 590 -2106	1.10	1.10	ppb	U
563-58-6	1,1-Dichloropropene	C 590 -2106	1.95	1.95	ppb	U
71-43-2	Benzene	C 590 -2106	1.05	1.05	ppb	U
107-06-2	1,2-Dichloroethane	C 590 -2106	1.15	**6.50**	ppb	
79-01-6	Trichloroethene	C 590 -2106	1.80	1.80	ppb	U
78-87-5	1,2-Dichloropropane	C 590 -2106	1.55	1.55	ppb	U
74-95-3	Dibromomethane	C 590 -2106	1.20	1.20	ppb	U
75-27-4	Bromodichloromethane	C 590 -2106	1.00	1.00	ppb	U
110-75-8	2-Chloroethylvinylether	C 590 -2106	1.65	1.65	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 590 -2106	0.80	0.80	ppb	U
108-10-1	4-Methyl-2-pentanone	C 590 -2106	3.15	3.15	ppb	U
108-88-3	Toluene	C 590 -2106	1.00	**7.30**	ppb	
10061-02-6	trans-1,3-Dichloropropene	C 590 -2106	0.80	0.80	ppb	U
79-00-5	1,1,2-Trichloroethane	C 590 -2106	0.80	0.80	ppb	U
127-18-4	Tetrachloroethene	C 590 -2106	0.55	0.55	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-6...continue

Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 590 -2106	1.05	1.05	ppb	U
591-78-6	2-Hexanone	C 590 -2106	4.70	4.70	ppb	U
124-48-1	Dibromochloromethane	C 590 -2106	0.65	0.65	ppb	U
106-93-4	1,2-Dibromoethane	C 590 -2106	0.85	0.85	ppb	U
108-90-7	Chlorobenzene	C 590 -2106	0.75	0.75	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 590 -2106	1.00	1.00	ppb	U
100-41-4	Ethylbenzene	C 590 -2106	1.10	1.10	ppb	U
108-38-3	m,p-xylene	C 590 -2106	1.70	1.70	ppb	U
95-47-6	o-xylene	C 590 -2106	1.25	1.25	ppb	U
100-42-5	Styrene	C 590 -2106	1.00	1.00	ppb	U
75-25-2	Bromoform	C 590 -2106	1.05	1.05	ppb	U
98-82-8	Isopropylbenzene	C 590 -2106	0.75	0.75	ppb	U
108-86-1	Bromobenzene	C 590 -2106	1.00	1.00	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 590 -2106	1.15	1.15	ppb	U
103-65-1	n-Propylbenzene	C 590 -2106	0.80	0.80	ppb	U
96-18-4	1,2,3-Trichloropropane	C 590 -2106	1.75	1.75	ppb	U
622-96-8	p-Ethyltoluene	C 590 -2106	0.80	0.80	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 590 -2106	1.00	1.00	ppb	U
95-49-8	2-Chlorotoluene	C 590 -2106	1.25	**21.1**	ppb	
106-43-4	4-Chlorotoluene	C 590 -2106	1.10	1.10	ppb	U
98-06-6	tert-Butylbenzene	C 590 -2106	0.95	0.95	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 590 -2106	0.85	**5.30**	ppb	
135-98-8	sec-Butylbenzene	C 590 -2106	1.10	1.10	ppb	U
99-87-6	p-Isopropyltoluene	C 590 -2106	0.85	0.85	ppb	U
541-73-1	1,3-Dichlorobenzene	C 590 -2106	0.85	0.85	ppb	U
106-46-7	1,4-Dichlorobenzene	C 590 -2106	0.50	0.50	ppb	U
95-50-1	1,2-Dichlorobenzene	C 590 -2106	0.55	0.55	ppb	U
105-05-5	p-Diethylbenzene	C 590 -2106	1.10	1.10	ppb	U
104-51-8	n-Butylbenzene	C 590 -2106	0.85	0.85	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 590 -2106	2.50	2.50	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 590 -2106	2.10	2.10	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 590 -2106	0.65	0.65	ppb	U
87-68-3	Hexachlorobutadiene	C 590 -2106	2.25	2.25	ppb	U
91-20-3	Naphthalene	C 590 -2106	1.45	1.45	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 590 -2106	0.95	0.95	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-6...continue

Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2037	99.1 %	(76-118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2037	96.3 %	(83-113)	
2037-26-5	TOLUENE-D8	C587-2037	101.0 %	(90-111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2106	102.0 %	(76-118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2106	96.4 %	(83-113)	
2037-26-5	TOLUENE-D8	C590-2106	103.0 %	(90-111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-7

Client Sample ID: MW - 8

Collected: 06/26/2002 13:30

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2038	0.76	0.76	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2038	0.50	0.50	ppb	U
74-87-3	Chloromethane	C 587 -2038	0.64	0.64	ppb	U
75-01-4	Vinyl Chloride	C 587 -2038	0.46	0.46	ppb	U
74-83-9	Bromomethane	C 587 -2038	0.64	0.64	ppb	U
75-00-3	Chloroethane	C 587 -2038	0.48	0.48	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2038	0.54	0.54	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2038	0.72	0.72	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2038	0.54	0.54	ppb	U
67-64-1	Acetone	C 587 -2038	2.26	2.26	ppb	U
75-15-0	Carbon disulfide	C 587 -2038	0.38	0.38	ppb	U
75-09-2	Methylene Chloride	C 587 -2038	0.42	0.42	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2038	0.62	0.62	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2038	0.36	0.36	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2038	0.60	0.60	ppb	U
590-20-7	2,2-Dichloropropane	C 587 -2038	0.54	0.54	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2038	0.48	0.48	ppb	U
78-93-3	2-Butanone	C 587 -2038	7.60	7.60	ppb	U
74-97-5	Bromochloromethane	C 587 -2038	0.50	0.50	ppb	U
67-66-3	Chloroform	C 587 -2038	0.52	0.52	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2038	0.52	0.52	ppb	U
56-23-5	Carbon Tetrachloride	C 587 -2038	0.44	0.44	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2038	0.78	0.78	ppb	U
71-43-2	Benzene	C 587 -2038	0.42	0.42	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2038	0.46	0.46	ppb	U
79-01-6	Trichloroethene	C 587 -2038	0.72	0.72	ppb	U
78-87-5	1,2-Dichloropropane	C 587 -2038	0.62	0.62	ppb	U
74-95-3	Dibromomethane	C 587 -2038	0.48	0.48	ppb	U
75-27-4	Bromodichloromethane	C 587 -2038	0.40	0.40	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2038	0.66	0.66	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2038	0.32	0.32	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2038	1.26	1.26	ppb	U
108-88-3	Toluene	C 587 -2038	0.40	0.40	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 587 -2038	0.32	0.32	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2038	0.32	0.32	ppb	U
127-18-4	Tetrachloroethene	C 587 -2038	0.22	0.22	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-7...continue

Client Sample ID: MW - 8 Collected: 06/26/2002 13:30
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2038	0.42	0.42	ppb	U
591-78-6	2-Hexanone	C 587 -2038	1.88	1.88	ppb	U
124-48-1	Dibromochloromethane	C 587 -2038	0.26	0.26	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2038	0.34	0.34	ppb	U
108-90-7	Chlorobenzene	C 587 -2038	0.30	0.30	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2038	0.40	0.40	ppb	U
100-41-4	Ethylbenzene	C 587 -2038	0.44	0.44	ppb	U
108-38-3	m,p-xylene	C 587 -2038	0.68	0.68	ppb	U
95-47-6	o-xylene	C 587 -2038	0.50	0.50	ppb	U
100-42-5	Styrene	C 587 -2038	0.40	0.40	ppb	U
75-25-2	Bromoform	C 587 -2038	0.42	0.42	ppb	U
98-82-8	Isopropylbenzene	C 587 -2038	0.30	0.30	ppb	U
108-86-1	Bromobenzene	C 587 -2038	0.40	0.40	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2038	0.46	0.46	ppb	U
103-65-1	n-Propylbenzene	C 587 -2038	0.32	0.32	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2038	0.70	0.70	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2038	0.32	0.32	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2038	0.40	0.40	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2038	0.50	0.50	ppb	U
106-43-4	4-Chlorotoluene	C 587 -2038	0.44	0.44	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2038	0.38	0.38	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2038	0.34	0.34	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2038	0.44	0.44	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2038	0.34	0.34	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2038	0.34	0.34	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2038	0.20	0.20	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2038	0.22	0.22	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2038	0.44	0.44	ppb	U
104-51-8	n-Butylbenzene	C 587 -2038	0.34	0.34	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2038	1.00	1.00	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2038	0.84	0.84	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2038	0.26	0.26	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2038	0.90	0.90	ppb	U
91-20-3	Naphthalene	C 587 -2038	0.58	0.58	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2038	0.38	0.38	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-7...continue

Client Sample ID: MW - 8
Collected: 06/26/2002 13:30
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2038	99.3 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2038	95.1 %	(83- 113)	
2037-26-5	TOLUENE-D8	C587-2038	102.0 %	(90- 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-8

Client Sample ID: MW - 12 Collected: 06/26/2002 15:00

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2039	3.80	3.80	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2039	2.50	2.50	ppb	U
74-87-3	Chloromethane	C 587 -2039	3.20	3.20	ppb	U
75-01-4	Vinyl Chloride	C 587 -2039	2.30	**151**	ppb	
74-83-9	Bromomethane	C 587 -2039	3.20	3.20	ppb	U
75-00-3	Chloroethane	C 587 -2039	2.40	2.40	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2039	2.70	2.70	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2039	3.60	3.60	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2039	2.70	2.70	ppb	U
67-64-1	Acetone	C 587 -2039	11.3	11.3	ppb	U
75-15-0	Carbon disulfide	C 587 -2039	1.90	1.90	ppb	U
75-09-2	Methylene Chloride	C 587 -2039	2.10	2.10	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2039	3.10	3.10	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2039	1.80	1.80	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2039	3.00	**345**	ppb	
590-20-7	2,2-Dichloropropane	C 587 -2039	2.70	2.70	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2039	2.40	**467**	ppb	
78-93-3	2-Butanone	C 587 -2039	38.0	38.0	ppb	U
74-97-5	Bromochloromethane	C 587 -2039	2.50	2.50	ppb	U
67-66-3	Chloroform	C 587 -2039	2.60	2.60	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2039	2.60	2.60	ppb	U
56-23-5	Carbon Tetrachloride	C 587 -2039	2.20	2.20	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2039	3.90	3.90	ppb	U
71-43-2	Benzene	C 587 -2039	2.10	2.10	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2039	2.30	2.30	ppb	U
79-01-6	Trichloroethene	C 587 -2039	3.60	**67.8**	ppb	
78-87-5	1,2-Dichloropropane	C 587 -2039	3.10	3.10	ppb	U
74-95-3	Dibromomethane	C 587 -2039	2.40	2.40	ppb	U
75-27-4	Bromodichloromethane	C 587 -2039	2.00	2.00	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2039	3.30	3.30	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2039	1.60	1.60	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2039	6.30	6.30	ppb	U
108-88-3	Toluene	C 587 -2039	2.00	2.00	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 587 -2039	1.60	1.60	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2039	1.60	1.60	ppb	U
127-18-4	Tetrachloroethene	C 587 -2039	1.10	1.10	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-8...continue

Client Sample ID: MW - 12 Collected: 06/26/2002 15:00

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2039	2.10	2.10	ppb	U
591-78-6	2-Hexanone	C 587 -2039	9.40	9.40	ppb	U
124-48-1	Dibromochloromethane	C 587 -2039	1.30	1.30	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2039	1.70	1.70	ppb	U
108-90-7	Chlorobenzene	C 587 -2039	1.50	1.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2039	2.00	2.00	ppb	U
100-41-4	Ethylbenzene	C 587 -2039	2.20	2.20	ppb	U
108-38-3	m,p-xylene	C 587 -2039	3.40	3.40	ppb	U
95-47-6	o-xylene	C 587 -2039	2.50	2.50	ppb	U
100-42-5	Styrene	C 587 -2039	2.00	2.00	ppb	U
75-25-2	Bromoform	C 587 -2039	2.10	2.10	ppb	U
98-82-8	Isopropylbenzene	C 587 -2039	1.50	1.50	ppb	U
108-86-1	Bromobenzene	C 587 -2039	2.00	2.00	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2039	2.30	2.30	ppb	U
103-65-1	n-Propylbenzene	C 587 -2039	1.60	1.60	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2039	3.50	3.50	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2039	1.60	1.60	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2039	2.00	2.00	ppb	U
95-49-8	2-Chlorotoluene	C 590 -2107	12.5	**1940**	ppb	
106-43-4	4-Chlorotoluene	C 587 -2039	2.20	**147**	ppb	
98-06-6	tert-Butylbenzene	C 587 -2039	1.90	1.90	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2039	1.70	1.70	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2039	2.20	2.20	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2039	1.70	1.70	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2039	1.70	1.70	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2039	1.00	1.00	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2039	1.10	1.10	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2039	2.20	2.20	ppb	U
104-51-8	n-Butylbenzene	C 587 -2039	1.70	1.70	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2039	5.00	5.00	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2039	4.20	4.20	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2039	1.30	1.30	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2039	4.50	4.50	ppb	U
91-20-3	Naphthalene	C 587 -2039	2.90	2.90	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2039	1.90	1.90	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-8...continue

Client Sample ID: MW - 12
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/26/2002 15:00

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2039	102.0 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2039	95.9 %	(83- 113)	
2037-26-5	TOLUENE-D8	C587-2039	102.0 %	(90- 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2107	102.0 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2107	97.0 %	(83- 113)	
2037-26-5	TOLUENE-D8	C590-2107	103.0 %	(90- 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-9

Client Sample ID: MW - 13 Collected: 06/26/2002 12:00

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2040	0.38	0.38	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2040	0.25	0.25	ppb	U
74-87-3	Chloromethane	C 587 -2040	0.32	0.32	ppb	U
75-01-4	Vinyl Chloride	C 587 -2040	0.23	**4.60**	ppb	
74-83-9	Bromomethane	C 587 -2040	0.32	0.32	ppb	U
75-00-3	Chloroethane	C 587 -2040	0.24	0.24	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2040	0.27	0.27	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2040	0.36	0.36	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2040	0.27	**2.80**	ppb	
67-64-1	Acetone	C 587 -2040	1.13	1.13	ppb	U
75-15-0	Carbon disulfide	C 587 -2040	0.19	0.19	ppb	U
75-09-2	Methylene Chloride	C 587 -2040	0.21	0.21	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2040	0.31	0.31	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2040	0.18	0.18	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2040	0.30	**17.0**	ppb	
590-20-7	2,2-Dichloropropane	C 587 -2040	0.27	0.27	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2040	0.24	**69.6**	ppb	
78-93-3	2-Butanone	C 587 -2040	3.80	3.80	ppb	U
74-97-5	Bromochloromethane	C 587 -2040	0.25	0.25	ppb	U
67-66-3	Chloroform	C 587 -2040	0.26	0.26	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2040	0.26	**1.20**	ppb	
56-23-5	Carbon Tetrachloride	C 587 -2040	0.22	0.22	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2040	0.39	0.39	ppb	U
71-43-2	Benzene	C 587 -2040	0.21	0.21	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2040	0.23	0.23	ppb	U
79-01-6	Trichloroethene	C 587 -2040	0.36	**13.9**	ppb	
78-87-5	1,2-Dichloropropane	C 587 -2040	0.31	0.31	ppb	U
74-95-3	Dibromomethane	C 587 -2040	0.24	0.24	ppb	U
75-27-4	Bromodichloromethane	C 587 -2040	0.20	0.20	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2040	0.33	0.33	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2040	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2040	0.63	0.63	ppb	U
108-88-3	Toluene	C 587 -2040	0.20	0.20	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 587 -2040	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2040	0.16	0.16	ppb	U
127-18-4	Tetrachloroethene	C 587 -2040	0.11	**16.2**	ppb	

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Volatile Compounds - EPA 8260B

Sample: M9235-9...continue

Client Sample ID: MW - 13 Collected: 06/26/2002 12:00
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2040	0.21	0.21	ppb	U
591-78-6	2-Hexanone	C 587 -2040	0.94	0.94	ppb	U
124-48-1	Dibromochloromethane	C 587 -2040	0.13	0.13	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2040	0.17	0.17	ppb	U
108-90-7	Chlorobenzene	C 587 -2040	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2040	0.20	0.20	ppb	U
100-41-4	Ethylbenzene	C 587 -2040	0.22	0.22	ppb	U
108-38-3	m,p-xylene	C 587 -2040	0.34	0.34	ppb	U
95-47-6	o-xylene	C 587 -2040	0.25	0.25	ppb	U
100-42-5	Styrene	C 587 -2040	0.20	0.20	ppb	U
75-25-2	Bromoform	C 587 -2040	0.21	0.21	ppb	U
98-82-8	Isopropylbenzene	C 587 -2040	0.15	0.15	ppb	U
108-86-1	Bromobenzene	C 587 -2040	0.20	0.20	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2040	0.23	0.23	ppb	U
103-65-1	n-Propylbenzene	C 587 -2040	0.16	0.16	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2040	0.35	0.35	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2040	0.16	0.16	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2040	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2040	0.25	**2.50**	ppb	
106-43-4	4-Chlorotoluene	C 587 -2040	0.22	0.22	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2040	0.19	0.19	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2040	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2040	0.22	0.22	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2040	0.17	0.17	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2040	0.17	0.17	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2040	0.10	0.10	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2040	0.11	0.11	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2040	0.22	0.22	ppb	U
104-51-8	n-Butylbenzene	C 587 -2040	0.17	0.17	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2040	0.50	0.50	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2040	0.42	0.42	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2040	0.13	0.13	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2040	0.45	0.45	ppb	U
91-20-3	Naphthalene	C 587 -2040	0.29	0.29	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2040	0.19	0.19	ppb	U

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Volatile Compounds - EPA 8260B

Sample: M9235-9...continue
Client Sample ID: MW - 13
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Type: Grab

Collected: 06/26/2002 12:00

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2040	99.6 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2040	95.6 %	(83- 113)	
2037-26-5	TOLUENE-D8	C587-2040	101.0 %	(90- 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-10

Client Sample ID: MW - 3S
Collected: 06/26/2002 16:30
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2041	0.38	0.38	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2041	0.25	0.25	ppb	U
74-87-3	Chloromethane	C 587 -2041	0.32	0.32	ppb	U
75-01-4	Vinyl Chloride	C 587 -2041	0.23	0.23	ppb	U
74-83-9	Bromomethane	C 587 -2041	0.32	0.32	ppb	U
75-00-3	Chloroethane	C 587 -2041	0.24	0.24	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2041	0.27	0.27	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2041	0.36	0.36	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2041	0.27	0.27	ppb	U
67-64-1	Acetone	C 587 -2041	1.13	1.13	ppb	U
75-15-0	Carbon disulfide	C 587 -2041	0.19	0.19	ppb	U
75-09-2	Methylene Chloride	C 587 -2041	0.21	0.21	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2041	0.31	0.31	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2041	0.18	0.18	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2041	0.30	0.30	ppb	U
590-20-7	2,2-Dichloropropane	C 587 -2041	0.27	0.27	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2041	0.24	**1.20**	ppb	
78-93-3	2-Butanone	C 587 -2041	3.80	3.80	ppb	U
74-97-5	Bromochloromethane	C 587 -2041	0.25	0.25	ppb	U
67-66-3	Chloroform	C 587 -2041	0.26	0.26	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2041	0.26	0.26	ppb	U
56-23-5	Carbon Tetrachloride	C 587 -2041	0.22	0.22	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2041	0.39	0.39	ppb	U
71-43-2	Benzene	C 587 -2041	0.21	0.21	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2041	0.23	0.23	ppb	U
79-01-6	Trichloroethene	C 587 -2041	0.36	**67.8**	ppb	
78-87-5	1,2-Dichloropropane	C 587 -2041	0.31	0.31	ppb	U
74-95-3	Dibromomethane	C 587 -2041	0.24	0.24	ppb	U
75-27-4	Bromodichloromethane	C 587 -2041	0.20	0.20	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2041	0.33	0.33	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2041	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2041	0.63	0.63	ppb	U
108-88-3	Toluene	C 587 -2041	0.20	0.20	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 587 -2041	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2041	0.16	0.16	ppb	U
127-18-4	Tetrachloroethene	C 587 -2041	0.11	**7.20**	ppb	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-10...continue

Client Sample ID: MW - 3S
Collected: 06/26/2002 16:30
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2041	0.21	0.21	ppb	U
591-78-6	2-Hexanone	C 587 -2041	0.94	0.94	ppb	U
124-48-1	Dibromochloromethane	C 587 -2041	0.13	0.13	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2041	0.17	0.17	ppb	U
108-90-7	Chlorobenzene	C 587 -2041	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2041	0.20	0.20	ppb	U
100-41-4	Ethylbenzene	C 587 -2041	0.22	0.22	ppb	U
108-38-3	m,p-xylene	C 587 -2041	0.34	0.34	ppb	U
95-47-6	o-xylene	C 587 -2041	0.25	0.25	ppb	U
100-42-5	Styrene	C 587 -2041	0.20	0.20	ppb	U
75-25-2	Bromoform	C 587 -2041	0.21	0.21	ppb	U
98-82-8	Isopropylbenzene	C 587 -2041	0.15	0.15	ppb	U
108-86-1	Bromobenzene	C 587 -2041	0.20	0.20	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2041	0.23	0.23	ppb	U
103-65-1	n-Propylbenzene	C 587 -2041	0.16	0.16	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2041	0.35	0.35	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2041	0.16	0.16	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2041	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2041	0.25	0.25	ppb	U
106-43-4	4-Chlorotoluene	C 587 -2041	0.22	0.22	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2041	0.19	0.19	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2041	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2041	0.22	0.22	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2041	0.17	0.17	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2041	0.17	0.17	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2041	0.10	0.10	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2041	0.11	0.11	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2041	0.22	0.22	ppb	U
104-51-8	n-Butylbenzene	C 587 -2041	0.17	0.17	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2041	0.50	0.50	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2041	0.42	0.42	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2041	0.13	0.13	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2041	0.45	0.45	ppb	U
91-20-3	Naphthalene	C 587 -2041	0.29	0.29	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2041	0.19	0.19	ppb	U

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Volatile Compounds - EPA 8260B

Sample: M9235-10...continue

Client Sample ID: MW - 3S
Collected: 06/26/2002 16:30
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2041	99.3 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2041	94.8 %	(83 - 118)	
2037-26-5	TOLUENE-D8	C587-2041	102.0 %	(90 - 111)	

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-11

Client Sample ID: MW - 4S
Collected: 06/26/2002 15:15
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 587 -2042	0.38	0.38	ppb	U
75-45-6	Chlorodifluoromethane	C 587 -2042	0.25	0.25	ppb	U
74-87-3	Chloromethane	C 587 -2042	0.32	0.32	ppb	U
75-01-4	Vinyl Chloride	C 587 -2042	0.23	0.23	ppb	U
74-83-9	Bromomethane	C 587 -2042	0.32	0.32	ppb	U
75-00-3	Chloroethane	C 587 -2042	0.24	0.24	ppb	U
75-69-4	Trichlorofluoromethane	C 587 -2042	0.27	0.27	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 587 -2042	0.36	0.36	ppb	U
75-35-4	1,1-Dichloroethene	C 587 -2042	0.27	0.27	ppb	U
67-64-1	Acetone	C 587 -2042	1.13	1.13	ppb	U
75-15-0	Carbon disulfide	C 587 -2042	0.19	0.19	ppb	U
75-09-2	Methylene Chloride	C 587 -2042	0.21	0.21	ppb	U
156-60-5	trans-1,2-Dichloroethene	C 587 -2042	0.31	0.31	ppb	U
1634-04-4	Methyl t-butyl ether	C 587 -2042	0.18	0.18	ppb	U
75-34-3	1,1-Dichloroethane	C 587 -2042	0.30	0.30	ppb	U
590-20-7	2,2-Dichloropropane	C 587 -2042	0.27	0.27	ppb	U
156-59-2	cis-1,2-Dichloroethene	C 587 -2042	0.24	**5.70**	ppb	
78-93-3	2-Butanone	C 587 -2042	3.80	3.80	ppb	U
74-97-5	Bromochloromethane	C 587 -2042	0.25	0.25	ppb	U
67-66-3	Chloroform	C 587 -2042	0.26	0.26	ppb	U
71-55-6	1,1,1-Trichloroethane	C 587 -2042	0.26	0.26	ppb	U
56-23-5	Carbon Tetrachloride	C 587 -2042	0.22	0.22	ppb	U
563-58-6	1,1-Dichloropropene	C 587 -2042	0.39	0.39	ppb	U
71-43-2	Benzene	C 587 -2042	0.21	0.21	ppb	U
107-06-2	1,2-Dichloroethane	C 587 -2042	0.23	0.23	ppb	U
79-01-6	Trichloroethene	C 587 -2042	0.36	**56.2**	ppb	
78-87-5	1,2-Dichloropropane	C 587 -2042	0.31	0.31	ppb	U
74-95-3	Dibromomethane	C 587 -2042	0.24	0.24	ppb	U
75-27-4	Bromodichloromethane	C 587 -2042	0.20	0.20	ppb	U
110-75-8	2-Chloroethylvinylether	C 587 -2042	0.33	0.33	ppb	U
10061-01-5	cis-1,3-Dichloropropene	C 587 -2042	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	C 587 -2042	0.63	0.63	ppb	U
108-88-3	Toluene	C 587 -2042	0.20	0.20	ppb	U
10061-02-6	trans-1,3-Dichloropropene	C 587 -2042	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	C 587 -2042	0.16	0.16	ppb	U
127-18-4	Tetrachloroethene	C 590 -2108	5.50	**2200**	ppb	

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Volatile Compounds - EPA 8260B

Sample: M9235-11...continue

Client Sample ID: MW - 4S
Collected: 06/26/2002 15:15
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 07/02/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 587 -2042	0.21	0.21	ppb	U
591-78-6	2-Hexanone	C 587 -2042	0.94	0.94	ppb	U
124-48-1	Dibromochloromethane	C 587 -2042	0.13	0.13	ppb	U
106-93-4	1,2-Dibromoethane	C 587 -2042	0.17	0.17	ppb	U
108-90-7	Chlorobenzene	C 587 -2042	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 587 -2042	0.20	0.20	ppb	U
100-41-4	Ethylbenzene	C 587 -2042	0.22	0.22	ppb	U
108-38-3	m,p-xylene	C 587 -2042	0.34	0.34	ppb	U
95-47-6	o-xylene	C 587 -2042	0.25	0.25	ppb	U
100-42-5	Styrene	C 587 -2042	0.20	0.20	ppb	U
75-25-2	Bromoform	C 587 -2042	0.21	0.21	ppb	U
98-82-8	Isopropylbenzene	C 587 -2042	0.15	0.15	ppb	U
108-86-1	Bromobenzene	C 587 -2042	0.20	0.20	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 587 -2042	0.23	0.23	ppb	U
103-65-1	n-Propylbenzene	C 587 -2042	0.16	0.16	ppb	U
96-18-4	1,2,3-Trichloropropane	C 587 -2042	0.35	0.35	ppb	U
622-96-8	p-Ethyltoluene	C 587 -2042	0.16	0.16	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 587 -2042	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	C 587 -2042	0.25	0.25	ppb	U
106-43-4	4-Chlorotoluene	C 587 -2042	0.22	0.22	ppb	U
98-06-6	tert-Butylbenzene	C 587 -2042	0.19	0.19	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 587 -2042	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	C 587 -2042	0.22	0.22	ppb	U
99-87-6	p-Isopropyltoluene	C 587 -2042	0.17	0.17	ppb	U
541-73-1	1,3-Dichlorobenzene	C 587 -2042	0.17	0.17	ppb	U
106-46-7	1,4-Dichlorobenzene	C 587 -2042	0.10	0.10	ppb	U
95-50-1	1,2-Dichlorobenzene	C 587 -2042	0.11	0.11	ppb	U
105-05-5	p-Diethylbenzene	C 587 -2042	0.22	0.22	ppb	U
104-51-8	n-Butylbenzene	C 587 -2042	0.17	0.17	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 587 -2042	0.50	0.50	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 587 -2042	0.42	0.42	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 587 -2042	0.13	0.13	ppb	U
87-68-3	Hexachlorobutadiene	C 587 -2042	0.45	0.45	ppb	U
91-20-3	Naphthalene	C 587 -2042	0.29	0.29	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 587 -2042	0.19	0.19	ppb	U

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07/09/2002

Volatile Compounds - EPA 8260B

Sample: M9235-11...continue

Client Sample ID: MW - 4S

Collected: 06/26/2002 15:15

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 07/02/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C587-2042	101.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C587-2042	92.9 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C587-2042	101.0 %	(90 - 111)	
460-00-4	4-BROMOFLUOROBENZENE	C590-2108	103.0 %	(76 - 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C590-2108	96.3 %	(83 - 113)	
2037-26-5	TOLUENE-D8	C590-2108	103.0 %	(90 - 111)	

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07/09/2002

Iron, Total

Sample: M9235-1
Client Sample ID: SMP - 1 Collected: 06/25/2002 17:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**11.2**	ppm	

Sample: M9235-2
Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**6.80**	ppm	

Sample: M9235-3
Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**4.63**	ppm	

Sample: M9235-4
Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**114**	ppm	

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07/09/2002

Iron, Total

Sample: M9235-5

Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**1010**	ppm	

Sample: M9235-6

Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**44.1**	ppm	

Sample: M9235-7

Client Sample ID: MW - 8 Collected: 06/26/2002 13:30

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**0.013**	ppm	

Sample: M9235-8

Client Sample ID: MW - 12 Collected: 06/26/2002 15:00

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**46.7**	ppm	

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07/09/2002

Iron, Total

Sample: M9235-9

Client Sample ID: MW - 13 Collected: 06/26/2002 12:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/01/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.0098	**0.27**	ppm	

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07/09/2002

Nitrogen/Nitrate - EPA 353.2

Sample: M9235-1
Client Sample ID: SMP - 1 Collected: 06/25/2002 17:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

Sample: M9235-2
Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.0040**	ppm	J

Sample: M9235-3
Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.017**	ppm	J

Sample: M9235-4
Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

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07/09/2002

Nitrogen/Nitrate - EPA 353.2

Sample: M9235-5
Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

Sample: M9235-6
Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

Sample: M9235-7
Client Sample ID: MW - 8 Collected: 06/26/2002 13:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**6.67**	ppm	

Sample: M9235-8
Client Sample ID: MW - 12 Collected: 06/26/2002 15:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

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07/09/2002

Nitrogen/Nitrate - EPA 353.2

Sample: M9235-9

Client Sample ID: MW - 13 Collected: 06/26/2002 12:00

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 06/27/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**2.15**	ppm	

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07/09/2002

Sulfate - EPA 375.4

Sample: M9235-1

Client Sample ID: SMP - 1 Collected: 06/25/2002 17:00

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**143**	ppm	

Sample: M9235-2

Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**590**	ppm	

Sample: M9235-3

Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**119**	ppm	

Sample: M9235-4

Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**185**	ppm	

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Sulfate - EPA 375.4

Sample: M9235-5
Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**119**	ppm	

Sample: M9235-6
Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**249**	ppm	

Sample: M9235-7
Client Sample ID: MW - 8 Collected: 06/26/2002 13:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**143**	ppm	

Sample: M9235-8
Client Sample ID: MW - 12 Collected: 06/26/2002 15:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**100**	ppm	

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07/09/2002

Sulfate - EPA 375.4

Sample: M9235-9

Client Sample ID: MW - 13

Collected: 06/26/2002 12:00

Matrix: Liquid

Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.56	**22.7**	ppm	

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07/09/2002

Total Organic Carbon - Method 415.1

Sample: M9235-1

Client Sample ID: SMP - 1 Collected: 06/25/2002 17:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**125**	ppm	

Sample: M9235-2

Client Sample ID: DMP - 1 Collected: 06/25/2002 17:15
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**24.3**	ppm	

Sample: M9235-3

Client Sample ID: SMP - 3 Collected: 06/25/2002 17:45
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**173**	ppm	

Sample: M9235-4

Client Sample ID: DMP - 3 Collected: 06/25/2002 17:30
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**349**	ppm	

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07/09/2002

Total Organic Carbon - Method 415.1

Sample: M9235-5

Client Sample ID: SMP - 4 Collected: 06/25/2002 18:30

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**3440**	ppm	

Sample: M9235-6

Client Sample ID: DMP - 4 Collected: 06/25/2002 18:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**161**	ppm	

Sample: M9235-7

Client Sample ID: MW - 8 Collected: 06/26/2002 13:30

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**6.60**	ppm	

Sample: M9235-8

Client Sample ID: MW - 12 Collected: 06/26/2002 15:00

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	0.51	ppm	U

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07/09/2002

Total Organic Carbon - Method 415.1

Sample: M9235-9

Client Sample ID: MW - 13 Collected: 06/26/2002 12:00
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 07/02/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	0.51	ppm	U

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07/09/2002

Case Narrative

VOLATILES:

The following compounds were calibrated at 25, 50, 100, 150 and 200 ppb levels in the initial calibration curve:

Acetone
2-Butanone
4-Methyl,2-pentanone
2-Hexanone

M&P-Xylenes and 2-Chloro ethyl vinyl ether were calibrated at 10, 40, 100, 200 and 300 ppb levels.

All other compounds were calibrated at 5, 20, 50, 100 and 150 ppb levels.

Reviewed by: _____

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07/09/2002

ORGANIC METHOD QUALIFIERS

Q - Qualifier - specified entries and their meanings are as follows:

U - The analytical result is a non-detect.

J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.

B - The analyte was found in the associated method blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

E - The concentration of the analyte exceeded the calibration range of the instrument.

D - This flag identifies all compounds identified in an analysis at a secondary dilution. In the case of a surrogate this flag indicates a system mointoring compound diluted out.

INORGANIC METHOD QUALIFIERS

C - (Concentration) qualifiers are as follows:

B - Entered if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

U - Entered when the analyte was analyzed for, but not detected.

Q - Qualifier specific entries and their meanings are as follows:

E - Reported value is estimated because of the presence of interferences.

M - (Method) qualifiers are as follows:

A - Flame AA

AS - Semi-automated Spectrophotometric

AV - Automated Cold Vapor AA

C - Manual Spectrophotometric

F - Furnace AA

P - ICP

T - Titrimetric

OTHER QUALIFIERS

ND - Not Detected

NA - Not Applicable

NR - Not Required

* - Outside Expected Range (NYCDEP Table I/II or Surrogate Limits)

OTHER

- All soil and sediment samples are reported on a dry weight basis.

ETL

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CHAIN OF CUSTODY DOCUMENT

M 9235

Project Name: Photo Circuits | Project Manager: Paula Nobrega | Sampler (Signature): | (Print): Dave Hanny / Bryce Dingwall

Project Address: 31 Sea Cliff Ave Glen Cove NY

Client Photo Circuits | J/N: | ☐ Rush by / /

SAMPLE INFO Type: SS = Split Spoon; G = Grab; C = Composite; B = Blank; Matrix: L = Liquid; S = Soil; SL = Sludge; A* = Air; W = Wipe | *Air - Vol. (Liters) include: Flow (CFM)

ID	Date	Time	Type	Matrix	Sample Location	Total. # Cont.	601/602	BTX/BTEX	MTBE	624/8260/8021 B	625/8270/BN	PCB/Pesticides	Pet.Prods./8100M	RCRA Metals	pH/Flash/React	418.1 - TRPH	TOC	Nitrate	Sulfate	IRON
1	6/25/02	1700	Amb	GW	SMP-1	5			X							X	X	X	X	
2		1715			DMP-1	5			X							X	X	X	X	
3		1745			SMP-3	5			X							X	X	X	X	
4		1730			DMP-3	5			X							X	X	X	X	
5		1830			SMP-4	5			X							X	X	X	X	
6		1810			DMP-4	5			X							X	X	X	X	
7	6/26/02	1330			MW-5	5			X							X	X	X	X	
8		1500			MW-12	5			X							X	X	X	X	
9		1200			MW-13	5			X							X	X	X	X	
10		1630			MW-35	2			X							[redacted]				
11		1515			MW-45	2			X							[redacted]				
12																				
13																				
14																				
15	6/26/02	1525	G	[redacted]	45A-INF	1			X											

Relinquished by (Signature):	Date / Time	Printed Name & Agent:	Received by (Signature):	Date / Time	Printed Name & Agent
	6/26/02 1735	David Hanny - BTC			
Relinquished by (Signature):	**Date / Time**	**Printed Name & Agent:**	**Received for Lab by (Signature):**	**Date / Time**	**Printed Name**
				6-26-02 1735	Ron Borg

Comments & Special Instructions	QA/QC Type:	Number & Type of Containers:	Preservatives:	Temp:
		9-500p 9-250p 9-Amb VOA's	HCl (VOA's) H2SO4 (Amb VOA's)	5°C

SUBSIDIARY COPY

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04/16/2002

Custody Document: L8329

Received: 04/04/2002 13:17
Sampled by: Dave Hanny

Client: Photo Circuits

31 Sea Cliff Avenue
Glen Cove,
NY 11542

Project: Photocircuits Corp.

31 Sea Cliff Avenue
Glen Cove,
NY

Manager: Andy Barber

Respectfully submitted,

Laboratory Manager

NYS Lab ID # 10969
NJ Cert. # 73812
CT Cert. # PH0645
MA Cert. # NY061
PA Cert. # 68-535
VA Cert. # 108
NH Cert. # 252592-BA
RI Cert. # 161

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-1

Client Sample ID: SMP-1 Collected: 04/02/2002 15:10
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1505	24.5	24.5	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1505	10.5	10.5	ppb	U
74-87-3	Chloromethane	B 732 -1505	24.5	24.5	ppb	U
75-01-4	Vinyl Chloride	B 732 -1505	5.00	**1780**	ppb	
74-83-9	Bromomethane	B 732 -1505	21.5	21.5	ppb	U
75-00-3	Chloroethane	B 732 -1505	30.5	30.5	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1505	12.0	12.0	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1505	11.5	11.5	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1505	15.0	**296**	ppb	
67-64-1	Acetone	B 732 -1505	156	156	ppb	U
75-15-0	Carbon disulfide	B 732 -1505	10.0	10.0	ppb	U
75-09-2	Methylene Chloride	B 732 -1505	27.0	27.0	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1505	10.0	**376**	ppb	
1634-04-4	Methyl t-butyl ether	B 732 -1505	17.0	17.0	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1505	11.0	**366**	ppb	
590-20-7	2,2-Dichloropropane	B 732 -1505	9.00	9.00	ppb	U
156-59-2	c-1,2-Dichloroethene	B 733 -1527	105	**42500**	ppb	
78-93-3	2-Butanone	B 732 -1505	250	250	ppb	U
74-97-5	Bromochloromethane	B 732 -1505	13.5	13.5	ppb	U
67-66-3	Chloroform	B 732 -1505	10.0	10.0	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1505	11.0	11.0	ppb	U
56-23-5	Carbon Tetrachloride	B 732 -1505	12.5	12.5	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1505	29.5	29.5	ppb	U
71-43-2	Benzene	B 732 -1505	8.00	8.00	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1505	11.5	11.5	ppb	U
79-01-6	Trichloroethene	B 733 -1527	80.0	**26600**	ppb	
78-87-5	1,2-Dichloropropane	B 732 -1505	18.0	18.0	ppb	U
74-95-3	Dibromomethane	B 732 -1505	9.00	9.00	ppb	U
75-27-4	Bromodichloromethane	B 732 -1505	7.50	7.50	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1505	6.50	6.50	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1505	8.00	8.00	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1505	250	250	ppb	U
108-88-3	Toluene	B 732 -1505	7.00	**194**	ppb	
10061-02-6	t-1,3-Dichloropropene	B 732 -1505	4.00	4.00	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1505	4.50	4.50	ppb	U
127-18-4	Tetrachloroethene	B 732 -1505	12.0	12.0	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-1...continue

Client Sample ID: SMP-1 Collected: 04/02/2002 15:10
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1505	10.0	10.0	ppb	U
591-78-6	2-Hexanone	B 732 -1505	250	250	ppb	U
124-48-1	Dibromochloromethane	B 732 -1505	5.50	5.50	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1505	5.00	5.00	ppb	U
108-90-7	Chlorobenzene	B 732 -1505	7.50	7.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1505	9.00	9.00	ppb	U
100-41-4	Ethylbenzene	B 732 -1505	11.0	11.0	ppb	U
108-38-3	m,p-xylene	B 732 -1505	21.0	21.0	ppb	U
95-47-6	o-xylene	B 732 -1505	10.0	10.0	ppb	U
100-42-5	Styrene	B 732 -1505	8.50	8.50	ppb	U
75-25-2	Bromoform	B 732 -1505	5.00	5.00	ppb	U
98-82-8	Isopropylbenzene	B 732 -1505	12.5	12.5	ppb	U
108-86-1	Bromobenzene	B 732 -1505	12.0	12.0	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1505	8.00	8.00	ppb	U
103-65-1	n-Propylbenzene	B 732 -1505	10.5	10.5	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1505	10.5	10.5	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1505	12.0	12.0	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1505	10.0	10.0	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1505	13.5	13.5	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1505	17.5	17.5	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1505	12.0	12.0	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1505	8.50	8.50	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1505	8.00	8.00	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1505	12.0	12.0	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1505	11.5	11.5	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1505	11.5	11.5	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1505	7.50	7.50	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1505	12.0	12.0	ppb	U
104-51-8	n-Butylbenzene	B 732 -1505	7.00	7.00	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1505	13.0	13.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1505	16.5	16.5	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1505	11.0	11.0	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1505	13.0	13.0	ppb	U
91-20-3	Naphthalene	B 732 -1505	7.00	7.00	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1505	8.50	8.50	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-1...continue

Client Sample ID: SMP-1 Collected: 04/02/2002 15:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1505	99.5 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1505	95.1 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1505	103.0 %	(86- 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1527	100.0 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1527	98.4 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1527	102.0 %	(86- 110)	

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-2

Client Sample ID: DMP-1
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Type: Grab

Collected: 04/02/2002 14:40

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 733 -1528	0.98	0.98	ppb	U
75-45-6	Chlorodifluoromethane	B 733 -1528	0.42	0.42	ppb	U
74-87-3	Chloromethane	B 733 -1528	0.98	0.98	ppb	U
75-01-4	Vinyl Chloride	B 733 -1528	0.20	**62.0**	ppb	
74-83-9	Bromomethane	B 733 -1528	0.86	0.86	ppb	U
75-00-3	Chloroethane	B 733 -1528	1.22	**69.7**	ppb	
75-69-4	Trichlorofluoromethane	B 733 -1528	0.48	0.48	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 733 -1528	0.46	0.46	ppb	U
75-35-4	1,1-Dichloroethene	B 733 -1528	0.60	0.60	ppb	U
67-64-1	Acetone	B 733 -1528	6.24	6.24	ppb	U
75-15-0	Carbon disulfide	B 733 -1528	0.40	0.40	ppb	U
75-09-2	Methylene Chloride	B 733 -1528	1.08	1.08	ppb	U
156-60-5	t-1,2-Dichloroethene	B 733 -1528	0.40	**3.90**	ppb	
1634-04-4	Methyl t-butyl ether	B 733 -1528	0.68	0.68	ppb	U
75-34-3	1,1-Dichloroethane	B 733 -1528	0.44	**240**	ppb	
590-20-7	2,2-Dichloropropane	B 733 -1528	0.36	0.36	ppb	U
156-59-2	c-1,2-Dichloroethene	B 733 -1528	0.42	**44.3**	ppb	
78-93-3	2-Butanone	B 733 -1528	10.0	10.0	ppb	U
74-97-5	Bromochloromethane	B 733 -1528	0.54	0.54	ppb	U
67-66-3	Chloroform	B 733 -1528	0.40	0.40	ppb	U
71-55-6	1,1,1-Trichloroethane	B 733 -1528	0.44	0.44	ppb	U
56-23-5	Carbon Tetrachloride	B 733 -1528	0.50	0.50	ppb	U
563-58-6	1,1-Dichloropropene	B 733 -1528	1.18	1.18	ppb	U
71-43-2	Benzene	B 733 -1528	0.32	0.32	ppb	U
107-06-2	1,2-Dichloroethane	B 733 -1528	0.46	0.46	ppb	U
79-01-6	Trichloroethene	B 733 -1528	0.32	**29.3**	ppb	
78-87-5	1,2-Dichloropropane	B 733 -1528	0.72	0.72	ppb	U
74-95-3	Dibromomethane	B 733 -1528	0.36	0.36	ppb	U
75-27-4	Bromodichloromethane	B 733 -1528	0.30	0.30	ppb	U
110-75-8	2-Chloroethylvinylether	B 733 -1528	0.26	0.26	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 733 -1528	0.32	0.32	ppb	U
108-10-1	4-Methyl-2-pentanone	B 733 -1528	10.0	10.0	ppb	U
108-88-3	Toluene	B 733 -1528	0.28	**2.20**	ppb	
10061-02-6	t-1,3-Dichloropropene	B 733 -1528	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	B 733 -1528	0.18	0.18	ppb	U
127-18-4	Tetrachloroethene	B 733 -1528	0.48	0.48	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-2...continue

Client Sample ID: DMP-1 Collected: 04/02/2002 14:40
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 733 -1528	0.40	0.40	ppb	U
591-78-6	2-Hexanone	B 733 -1528	10.0	10.0	ppb	U
124-48-1	Dibromochloromethane	B 733 -1528	0.22	0.22	ppb	U
106-93-4	1,2-Dibromoethane	B 733 -1528	0.20	0.20	ppb	U
108-90-7	Chlorobenzene	B 733 -1528	0.30	0.30	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 733 -1528	0.36	0.36	ppb	U
100-41-4	Ethylbenzene	B 733 -1528	0.44	0.44	ppb	U
108-38-3	m,p-xylene	B 733 -1528	0.84	0.84	ppb	U
95-47-6	o-xylene	B 733 -1528	0.40	0.40	ppb	U
100-42-5	Styrene	B 733 -1528	0.34	0.34	ppb	U
75-25-2	Bromoform	B 733 -1528	0.20	0.20	ppb	U
98-82-8	Isopropylbenzene	B 733 -1528	0.50	0.50	ppb	U
108-86-1	Bromobenzene	B 733 -1528	0.48	0.48	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 733 -1528	0.32	0.32	ppb	U
103-65-1	n-Propylbenzene	B 733 -1528	0.42	0.42	ppb	U
96-18-4	1,2,3-Trichloropropane	B 733 -1528	0.42	0.42	ppb	U
622-96-8	p-Ethyltoluene	B 733 -1528	0.48	0.48	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 733 -1528	0.40	0.40	ppb	U
95-49-8	2-Chlorotoluene	B 733 -1528	0.54	**57.6**	ppb	
106-43-4	4-Chlorotoluene	B 733 -1528	0.70	0.70	ppb	U
98-06-6	tert-Butylbenzene	B 733 -1528	0.48	0.48	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 733 -1528	0.34	**3.40**	ppb	
135-98-8	sec-Butylbenzene	B 733 -1528	0.32	0.32	ppb	U
99-87-6	4-Isopropyltoluene	B 733 -1528	0.48	0.48	ppb	U
541-73-1	1,3-Dichlorobenzene	B 733 -1528	0.46	0.46	ppb	U
106-46-7	1,4-Dichlorobenzene	B 733 -1528	0.46	0.46	ppb	U
95-50-1	1,2-Dichlorobenzene	B 733 -1528	0.30	0.30	ppb	U
105-05-5	p-Diethylbenzene	B 733 -1528	0.48	0.48	ppb	U
104-51-8	n-Butylbenzene	B 733 -1528	0.28	0.28	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 733 -1528	0.52	0.52	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 733 -1528	0.66	0.66	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 733 -1528	0.44	0.44	ppb	U
87-68-3	Hexachlorobutadiene	B 733 -1528	0.52	0.52	ppb	U
91-20-3	Naphthalene	B 733 -1528	0.28	0.28	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 733 -1528	0.34	0.34	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-2...continue

Client Sample ID: DMP-1 Collected: 04/02/2002 14:40

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B733-1528	99.8 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1528	96.1 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1528	102.0 %	(86- 110)	

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Volatiles - EPA 8260B

Sample: L8329-3

Client Sample ID: SMP-3 Collected: 04/02/2002 13:50

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/10/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	C 483 -8657	48.0	48.0	ppb	U
75-45-6	Chlorodifluoromethane	C 483 -8657	42.0	42.0	ppb	U
74-87-3	Chloromethane	C 483 -8657	170	170	ppb	U
75-01-4	Vinyl Chloride	C 483 -8657	170	170	ppb	U
74-83-9	Bromomethane	C 483 -8657	130	130	ppb	U
75-00-3	Chloroethane	C 483 -8657	134	134	ppb	U
75-69-4	Trichlorofluoromethane	C 483 -8657	24.0	24.0	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	C 483 -8657	38.0	38.0	ppb	U
75-35-4	1,1-Dichloroethene	C 483 -8657	44.0	44.0	ppb	U
67-64-1	Acetone	C 483 -8657	460	460	ppb	U
75-15-0	Carbon disulfide	C 483 -8657	66.0	66.0	ppb	U
75-09-2	Methylene Chloride	C 483 -8657	74.0	**152**	ppb	
156-60-5	t-1,2-Dichloroethene	C 483 -8657	56.0	56.0	ppb	U
1634-04-4	Methyl t-butyl ether	C 483 -8657	36.0	36.0	ppb	U
75-34-3	1,1-Dichloroethane	C 483 -8657	50.0	**20500**	ppb	
590-20-7	2,2-Dichloropropane	C 483 -8657	60.0	60.0	ppb	U
156-59-2	c-1,2-Dichloroethene	C 483 -8657	36.0	36.0	ppb	U
78-93-3	2-Butanone	C 483 -8657	3440	3440	ppb	U
74-97-5	Bromochloromethane	C 483 -8657	30.0	30.0	ppb	U
67-66-3	Chloroform	C 483 -8657	44.0	44.0	ppb	U
71-55-6	1,1,1-Trichloroethane	C 483 -8657	28.0	**7610**	ppb	
56-23-5	Carbon Tetrachloride	C 483 -8657	20.0	20.0	ppb	U
563-58-6	1,1-Dichloropropene	C 483 -8657	36.0	36.0	ppb	U
71-43-2	Benzene	C 483 -8657	34.0	34.0	ppb	U
107-06-2	1,2-Dichloroethane	C 483 -8657	32.0	32.0	ppb	U
79-01-6	Trichloroethene	C 483 -8657	34.0	34.0	ppb	U
78-87-5	1,2-Dichloropropane	C 483 -8657	28.0	28.0	ppb	U
74-95-3	Dibromomethane	C 483 -8657	32.0	32.0	ppb	U
75-27-4	Bromodichloromethane	C 483 -8657	32.0	32.0	ppb	U
110-75-8	2-Chloroethylvinylether	C 483 -8657	58.0	58.0	ppb	U
10061-01-5	c-1,3-Dichloropropene	C 483 -8657	44.0	44.0	ppb	U
108-10-1	4-Methyl-2-pentanone	C 483 -8657	1800	1800	ppb	U
108-88-3	Toluene	C 483 -8657	28.0	28.0	ppb	U
10061-02-6	t-1,3-Dichloropropene	C 483 -8657	28.0	28.0	ppb	U
79-00-5	1,1,2-Trichloroethane	C 483 -8657	38.0	38.0	ppb	U
127-18-4	Tetrachloroethene	C 483 -8657	24.0	24.0	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-3...continue

Client Sample ID: SMP-3 Collected: 04/02/2002 13:50

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/10/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	C 483 -8657	24.0	24.0	ppb	U
591-78-6	2-Hexanone	C 483 -8657	1000	1000	ppb	U
124-48-1	Dibromochloromethane	C 483 -8657	34.0	34.0	ppb	U
106-93-4	1,2-Dibromoethane	C 483 -8657	38.0	38.0	ppb	U
108-90-7	Chlorobenzene	C 483 -8657	38.0	38.0	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	C 483 -8657	30.0	30.0	ppb	U
100-41-4	Ethylbenzene	C 483 -8657	32.0	32.0	ppb	U
108-38-3	m,p-xylene	C 483 -8657	42.0	42.0	ppb	U
95-47-6	o-xylene	C 483 -8657	32.0	32.0	ppb	U
100-42-5	Styrene	C 483 -8657	26.0	26.0	ppb	U
75-25-2	Bromoform	C 483 -8657	54.0	54.0	ppb	U
98-82-8	Isopropylbenzene	C 483 -8657	20.0	20.0	ppb	U
108-86-1	Bromobenzene	C 483 -8657	42.0	42.0	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	C 483 -8657	30.0	30.0	ppb	U
103-65-1	n-Propylbenzene	C 483 -8657	28.0	28.0	ppb	U
96-18-4	1,2,3-Trichloropropane	C 483 -8657	48.0	48.0	ppb	U
622-96-8	p-Ethyltoluene	C 483 -8657	48.0	48.0	ppb	U
108-67-8	1,3,5-Trimethylbenzene	C 483 -8657	24.0	24.0	ppb	U
95-49-8	2-Chlorotoluene	C 483 -8657	42.0	42.0	ppb	U
106-43-4	4-Chlorotoluene	C 483 -8657	32.0	32.0	ppb	U
98-06-6	tert-Butylbenzene	C 483 -8657	26.0	26.0	ppb	U
95-63-6	1,2,4-Trimethylbenzene	C 483 -8657	26.0	26.0	ppb	U
135-98-8	sec-Butylbenzene	C 483 -8657	16.0	16.0	ppb	U
99-87-6	4-Isopropyltoluene	C 483 -8657	20.0	20.0	ppb	U
541-73-1	1,3-Dichlorobenzene	C 483 -8657	30.0	30.0	ppb	U
106-46-7	1,4-Dichlorobenzene	C 483 -8657	30.0	30.0	ppb	U
95-50-1	1,2-Dichlorobenzene	C 483 -8657	28.0	28.0	ppb	U
105-05-5	p-Diethylbenzene	C 483 -8657	54.0	54.0	ppb	U
104-51-8	n-Butylbenzene	C 483 -8657	28.0	28.0	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	C 483 -8657	54.0	54.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	C 483 -8657	100	100	ppb	U
120-82-1	1,2,4-Trichlorobenzene	C 483 -8657	50.0	50.0	ppb	U
87-68-3	Hexachlorobutadiene	C 483 -8657	48.0	48.0	ppb	U
91-20-3	Naphthalene	C 483 -8657	54.0	54.0	ppb	U
87-61-6	1,2,3-Trichlorobenzene	C 483 -8657	76.0	76.0	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-3...continue

Client Sample ID: SMP-3

Collected: 04/02/2002 13:50

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/10/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	C483-8657	99.4 %	(76- 118)	
4774-33-8	DIBROMOFLUOROMETHANE	C483-8657	103.0 %	(83- 113)	
2037-26-5	TOLUENE-D8	C483-8657	101.0 %	(90- 111)	

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Volatiles - EPA 8260B

Sample: L8329-4

Client Sample ID: DMP-3 Collected: 04/02/2002 13:20

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1508	24.5	24.5	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1508	10.5	10.5	ppb	U
74-87-3	Chloromethane	B 732 -1508	24.5	24.5	ppb	U
75-01-4	Vinyl Chloride	B 732 -1508	5.00	**397**	ppb	
74-83-9	Bromomethane	B 732 -1508	21.5	21.5	ppb	U
75-00-3	Chloroethane	B 732 -1508	30.5	**1900**	ppb	
75-69-4	Trichlorofluoromethane	B 732 -1508	12.0	12.0	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1508	11.5	11.5	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1508	15.0	15.0	ppb	U
67-64-1	Acetone	B 732 -1508	156	156	ppb	U
75-15-0	Carbon disulfide	B 732 -1508	10.0	10.0	ppb	U
75-09-2	Methylene Chloride	B 732 -1508	27.0	27.0	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1508	10.0	10.0	ppb	U
1634-04-4	Methyl t-butyl ether	B 732 -1508	17.0	17.0	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1508	11.0	**3770**	ppb	
590-20-7	2,2-Dichloropropane	B 732 -1508	9.00	9.00	ppb	U
156-59-2	c-1,2-Dichloroethene	B 732 -1508	10.5	10.5	ppb	U
78-93-3	2-Butanone	B 732 -1508	250	250	ppb	U
74-97-5	Bromochloromethane	B 732 -1508	13.5	13.5	ppb	U
67-66-3	Chloroform	B 732 -1508	10.0	10.0	ppb	U
71-55-6	1,1,1-Trichloroethane	B 733 -1530	22.0	**11600**	ppb	
56-23-5	Carbon Tetrachloride	B 732 -1508	12.5	12.5	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1508	29.5	29.5	ppb	U
71-43-2	Benzene	B 732 -1508	8.00	8.00	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1508	11.5	11.5	ppb	U
79-01-6	Trichloroethene	B 732 -1508	8.00	8.00	ppb	U
78-87-5	1,2-Dichloropropane	B 732 -1508	18.0	18.0	ppb	U
74-95-3	Dibromomethane	B 732 -1508	9.00	9.00	ppb	U
75-27-4	Bromodichloromethane	B 732 -1508	7.50	7.50	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1508	6.50	6.50	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1508	8.00	8.00	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1508	250	250	ppb	U
108-88-3	Toluene	B 732 -1508	7.00	**84.0**	ppb	
10061-02-6	t-1,3-Dichloropropene	B 732 -1508	4.00	4.00	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1508	4.50	4.50	ppb	U
127-18-4	Tetrachloroethene	B 732 -1508	12.0	12.0	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-4...continue

Client Sample ID: DMP-3 Collected: 04/02/2002 13:20

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1508	10.0	10.0	ppb	U
591-78-6	2-Hexanone	B 732 -1508	250	250	ppb	U
124-48-1	Dibromochloromethane	B 732 -1508	5.50	5.50	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1508	5.00	5.00	ppb	U
108-90-7	Chlorobenzene	B 732 -1508	7.50	7.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1508	9.00	9.00	ppb	U
100-41-4	Ethylbenzene	B 732 -1508	11.0	11.0	ppb	U
108-38-3	m,p-xylene	B 732 -1508	21.0	21.0	ppb	U
95-47-6	o-xylene	B 732 -1508	10.0	10.0	ppb	U
100-42-5	Styrene	B 732 -1508	8.50	8.50	ppb	U
75-25-2	Bromoform	B 732 -1508	5.00	5.00	ppb	U
98-82-8	Isopropylbenzene	B 732 -1508	12.5	12.5	ppb	U
108-86-1	Bromobenzene	B 732 -1508	12.0	12.0	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1508	8.00	8.00	ppb	U
103-65-1	n-Propylbenzene	B 732 -1508	10.5	10.5	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1508	10.5	10.5	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1508	12.0	12.0	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1508	10.0	10.0	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1508	13.5	13.5	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1508	17.5	17.5	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1508	12.0	12.0	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1508	8.50	8.50	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1508	8.00	8.00	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1508	12.0	12.0	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1508	11.5	11.5	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1508	11.5	11.5	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1508	7.50	7.50	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1508	12.0	12.0	ppb	U
104-51-8	n-Butylbenzene	B 732 -1508	7.00	7.00	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1508	13.0	13.0	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1508	16.5	16.5	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1508	11.0	11.0	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1508	13.0	13.0	ppb	U
91-20-3	Naphthalene	B 732 -1508	7.00	7.00	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1508	8.50	8.50	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-4...continue

Client Sample ID: DMP-3
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Type: Grab

Collected: 04/02/2002 13:20

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1508	100.0 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1508	92.8 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1508	104.0 %	(86- 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1530	98.9 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1530	94.0 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1530	103.0 %	(86- 110)	

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Volatiles - EPA 8260B

Sample: L8329-5

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 733 -1531	0.98	0.98	ppb	U
75-45-6	Chlorodifluoromethane	B 733 -1531	0.42	0.42	ppb	U
74-87-3	Chloromethane	B 733 -1531	0.98	0.98	ppb	U
75-01-4	Vinyl Chloride	B 733 -1531	0.20	0.20	ppb	U
74-83-9	Bromomethane	B 733 -1531	0.86	0.86	ppb	U
75-00-3	Chloroethane	B 732 -1509	30.5	**1260**	ppb	
75-69-4	Trichlorofluoromethane	B 733 -1531	0.48	0.48	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 733 -1531	0.46	0.46	ppb	U
75-35-4	1,1-Dichloroethene	B 733 -1531	0.60	0.60	ppb	U
67-64-1	Acetone	B 733 -1531	6.24	6.24	ppb	U
75-15-0	Carbon disulfide	B 733 -1531	0.40	0.40	ppb	U
75-09-2	Methylene Chloride	B 733 -1531	1.08	**12.2**	ppb	
156-60-5	t-1,2-Dichloroethene	B 733 -1531	0.40	0.40	ppb	U
1634-04-4	Methyl t-butyl ether	B 733 -1531	0.68	0.68	ppb	U
75-34-3	1,1-Dichloroethane	B 733 -1531	0.44	**38.6**	ppb	
590-20-7	2,2-Dichloropropane	B 733 -1531	0.36	0.36	ppb	U
156-59-2	c-1,2-Dichloroethene	B 733 -1531	0.42	0.42	ppb	U
78-93-3	2-Butanone	B 733 -1531	10.0	10.0	ppb	U
74-97-5	Bromochloromethane	B 733 -1531	0.54	0.54	ppb	U
67-66-3	Chloroform	B 733 -1531	0.40	0.40	ppb	U
71-55-6	1,1,1-Trichloroethane	B 733 -1531	0.44	0.44	ppb	U
56-23-5	Carbon Tetrachloride	B 733 -1531	0.50	0.50	ppb	U
563-58-6	1,1-Dichloropropene	B 733 -1531	1.18	1.18	ppb	U
71-43-2	Benzene	B 733 -1531	0.32	0.32	ppb	U
107-06-2	1,2-Dichloroethane	B 733 -1531	0.46	0.46	ppb	U
79-01-6	Trichloroethene	B 733 -1531	0.32	0.32	ppb	U
78-87-5	1,2-Dichloropropane	B 733 -1531	0.72	0.72	ppb	U
74-95-3	Dibromomethane	B 733 -1531	0.36	0.36	ppb	U
75-27-4	Bromodichloromethane	B 733 -1531	0.30	0.30	ppb	U
110-75-8	2-Chloroethylvinylether	B 733 -1531	0.26	0.26	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 733 -1531	0.32	0.32	ppb	U
108-10-1	4-Methyl-2-pentanone	B 733 -1531	10.0	10.0	ppb	U
108-88-3	Toluene	B 733 -1531	0.28	**10.2**	ppb	
10061-02-6	t-1,3-Dichloropropene	B 733 -1531	0.16	0.16	ppb	U
79-00-5	1,1,2-Trichloroethane	B 733 -1531	0.18	0.18	ppb	U
127-18-4	Tetrachloroethene	B 733 -1531	0.48	0.48	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-5...continue

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 733 -1531	0.40	0.40	ppb	U
591-78-6	2-Hexanone	B 733 -1531	10.0	10.0	ppb	U
124-48-1	Dibromochloromethane	B 733 -1531	0.22	0.22	ppb	U
106-93-4	1,2-Dibromoethane	B 733 -1531	0.20	0.20	ppb	U
108-90-7	Chlorobenzene	B 733 -1531	0.30	0.30	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 733 -1531	0.36	0.36	ppb	U
100-41-4	Ethylbenzene	B 733 -1531	0.44	0.44	ppb	U
108-38-3	m,p-xylene	B 733 -1531	0.84	**2.20**	ppb	
95-47-6	o-xylene	B 733 -1531	0.40	**3.60**	ppb	
100-42-5	Styrene	B 733 -1531	0.34	0.34	ppb	U
75-25-2	Bromoform	B 733 -1531	0.20	0.20	ppb	U
98-82-8	Isopropylbenzene	B 733 -1531	0.50	0.50	ppb	U
108-86-1	Bromobenzene	B 733 -1531	0.48	0.48	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 733 -1531	0.32	0.32	ppb	U
103-65-1	n-Propylbenzene	B 733 -1531	0.42	0.42	ppb	U
96-18-4	1,2,3-Trichloropropane	B 733 -1531	0.42	0.42	ppb	U
622-96-8	p-Ethyltoluene	B 733 -1531	0.48	0.48	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 733 -1531	0.40	**6.90**	ppb	
95-49-8	2-Chlorotoluene	B 733 -1531	0.54	**40.2**	ppb	
106-43-4	4-Chlorotoluene	B 733 -1531	0.70	0.70	ppb	U
98-06-6	tert-Butylbenzene	B 733 -1531	0.48	0.48	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 733 -1531	0.34	**13.5**	ppb	
135-98-8	sec-Butylbenzene	B 733 -1531	0.32	0.32	ppb	U
99-87-6	4-Isopropyltoluene	B 733 -1531	0.48	0.48	ppb	U
541-73-1	1,3-Dichlorobenzene	B 733 -1531	0.46	0.46	ppb	U
106-46-7	1,4-Dichlorobenzene	B 733 -1531	0.46	0.46	ppb	U
95-50-1	1,2-Dichlorobenzene	B 733 -1531	0.30	0.30	ppb	U
105-05-5	p-Diethylbenzene	B 733 -1531	0.48	0.48	ppb	U
104-51-8	n-Butylbenzene	B 733 -1531	0.28	0.28	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 733 -1531	0.52	0.52	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 733 -1531	0.66	0.66	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 733 -1531	0.44	0.44	ppb	U
87-68-3	Hexachlorobutadiene	B 733 -1531	0.52	0.52	ppb	U
91-20-3	Naphthalene	B 733 -1531	0.28	0.28	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 733 -1531	0.34	0.34	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-5...continue

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1509	101.0 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1509	97.4 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1509	103.0 %	(86- 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1531	98.9 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1531	96.7 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1531	100.0 %	(86- 110)	

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Volatiles - EPA 8260B

Sample: L8329-6

Client Sample ID: MW-8 Collected: 04/03/2002 13:35

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1510	0.49	0.49	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1510	0.21	0.21	ppb	U
74-87-3	Chloromethane	B 732 -1510	0.49	0.49	ppb	U
75-01-4	Vinyl Chloride	B 732 -1510	0.10	0.10	ppb	U
74-83-9	Bromomethane	B 732 -1510	0.43	0.43	ppb	U
75-00-3	Chloroethane	B 732 -1510	0.61	0.61	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1510	0.24	0.24	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1510	0.23	0.23	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1510	0.30	0.30	ppb	U
67-64-1	Acetone	B 732 -1510	3.12	3.12	ppb	U
75-15-0	Carbon disulfide	B 732 -1510	0.20	0.20	ppb	U
75-09-2	Methylene Chloride	B 732 -1510	0.54	0.54	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1510	0.20	0.20	ppb	U
1634-04-4	Methyl t-butyl ether	B 732 -1510	0.34	0.34	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1510	0.22	0.22	ppb	U
590-20-7	2,2-Dichloropropane	B 732 -1510	0.18	0.18	ppb	U
156-59-2	c-1,2-Dichloroethene	B 732 -1510	0.21	0.21	ppb	U
78-93-3	2-Butanone	B 732 -1510	5.00	5.00	ppb	U
74-97-5	Bromochloromethane	B 732 -1510	0.27	0.27	ppb	U
67-66-3	Chloroform	B 732 -1510	0.20	0.20	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1510	0.22	0.22	ppb	U
56-23-5	Carbon Tetrachloride	B 732 -1510	0.25	0.25	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1510	0.59	0.59	ppb	U
71-43-2	Benzene	B 732 -1510	0.16	0.16	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1510	0.23	0.23	ppb	U
79-01-6	Trichloroethene	B 732 -1510	0.16	0.16	ppb	U
78-87-5	1,2-Dichloropropane	B 732 -1510	0.36	0.36	ppb	U
74-95-3	Dibromomethane	B 732 -1510	0.18	0.18	ppb	U
75-27-4	Bromodichloromethane	B 732 -1510	0.15	0.15	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1510	0.13	0.13	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1510	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1510	5.00	5.00	ppb	U
108-88-3	Toluene	B 732 -1510	0.14	0.14	ppb	U
10061-02-6	t-1,3-Dichloropropene	B 732 -1510	0.080	0.080	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1510	0.090	0.090	ppb	U
127-18-4	Tetrachloroethene	B 732 -1510	0.24	0.24	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-6...continue

Client Sample ID: MW-8 Collected: 04/03/2002 13:35

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1510	0.20	0.20	ppb	U
591-78-6	2-Hexanone	B 732 -1510	5.00	5.00	ppb	U
124-48-1	Dibromochloromethane	B 732 -1510	0.11	0.11	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1510	0.10	0.10	ppb	U
108-90-7	Chlorobenzene	B 732 -1510	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1510	0.18	0.18	ppb	U
100-41-4	Ethylbenzene	B 732 -1510	0.22	0.22	ppb	U
108-38-3	m,p-xylene	B 732 -1510	0.42	0.42	ppb	U
95-47-6	o-xylene	B 732 -1510	0.20	0.20	ppb	U
100-42-5	Styrene	B 732 -1510	0.17	0.17	ppb	U
75-25-2	Bromoform	B 732 -1510	0.10	0.10	ppb	U
98-82-8	Isopropylbenzene	B 732 -1510	0.25	0.25	ppb	U
108-86-1	Bromobenzene	B 732 -1510	0.24	0.24	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1510	0.16	0.16	ppb	U
103-65-1	n-Propylbenzene	B 732 -1510	0.21	0.21	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1510	0.21	0.21	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1510	0.24	0.24	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1510	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1510	0.27	0.27	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1510	0.35	0.35	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1510	0.24	0.24	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1510	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1510	0.16	0.16	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1510	0.24	0.24	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1510	0.23	0.23	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1510	0.23	0.23	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1510	0.15	0.15	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1510	0.24	0.24	ppb	U
104-51-8	n-Butylbenzene	B 732 -1510	0.14	0.14	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1510	0.26	0.26	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1510	0.33	0.33	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1510	0.22	0.22	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1510	0.26	0.26	ppb	U
91-20-3	Naphthalene	B 732 -1510	0.14	0.14	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1510	0.17	0.17	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-6...continue

Client Sample ID: MW-8

Matrix: Liquid

Type: Grab

Collected: 04/03/2002 13:35

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1510	100.0 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1510	98.5 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1510	102.0 %	(86- 110)	

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Volatiles - EPA 8260B

Sample: L8329-7

Client Sample ID: MW-12 Collected: 04/03/2002 12:20

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 733 -1532	4.90	4.90	ppb	U
75-45-6	Chlorodifluoromethane	B 733 -1532	2.10	2.10	ppb	U
74-87-3	Chloromethane	B 733 -1532	4.90	4.90	ppb	U
75-01-4	Vinyl Chloride	B 733 -1532	1.00	**333**	ppb	
74-83-9	Bromomethane	B 733 -1532	4.30	4.30	ppb	U
75-00-3	Chloroethane	B 733 -1532	6.10	6.10	ppb	U
75-69-4	Trichlorofluoromethane	B 733 -1532	2.40	2.40	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 733 -1532	2.30	2.30	ppb	U
75-35-4	1,1-Dichloroethene	B 733 -1532	3.00	3.00	ppb	U
67-64-1	Acetone	B 733 -1532	31.2	31.2	ppb	U
75-15-0	Carbon disulfide	B 733 -1532	2.00	2.00	ppb	U
75-09-2	Methylene Chloride	B 733 -1532	5.40	5.40	ppb	U
156-60-5	t-1,2-Dichloroethene	B 733 -1532	2.00	2.00	ppb	U
1634-04-4	Methyl t-butyl ether	B 733 -1532	3.40	3.40	ppb	U
75-34-3	1,1-Dichloroethane	B 733 -1532	2.20	**684**	ppb	
590-20-7	2,2-Dichloropropane	B 733 -1532	1.80	1.80	ppb	U
156-59-2	c-1,2-Dichloroethene	B 733 -1532	2.10	**503**	ppb	
78-93-3	2-Butanone	B 733 -1532	50.0	50.0	ppb	U
74-97-5	Bromochloromethane	B 733 -1532	2.70	2.70	ppb	U
67-66-3	Chloroform	B 733 -1532	2.00	2.00	ppb	U
71-55-6	1,1,1-Trichloroethane	B 733 -1532	2.20	2.20	ppb	U
56-23-5	Carbon Tetrachloride	B 733 -1532	2.50	2.50	ppb	U
563-58-6	1,1-Dichloropropene	B 733 -1532	5.90	5.90	ppb	U
71-43-2	Benzene	B 733 -1532	1.60	1.60	ppb	U
107-06-2	1,2-Dichloroethane	B 733 -1532	2.30	2.30	ppb	U
79-01-6	Trichloroethene	B 733 -1532	1.60	**31.0**	ppb	
78-87-5	1,2-Dichloropropane	B 733 -1532	3.60	3.60	ppb	U
74-95-3	Dibromomethane	B 733 -1532	1.80	1.80	ppb	U
75-27-4	Bromodichloromethane	B 733 -1532	1.50	1.50	ppb	U
110-75-8	2-Chloroethylvinylether	B 733 -1532	1.30	1.30	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 733 -1532	1.60	1.60	ppb	U
108-10-1	4-Methyl-2-pentanone	B 733 -1532	50.0	50.0	ppb	U
108-88-3	Toluene	B 733 -1532	1.40	**11.4**	ppb	
10061-02-6	t-1,3-Dichloropropene	B 733 -1532	0.80	0.80	ppb	U
79-00-5	1,1,2-Trichloroethane	B 733 -1532	0.90	0.90	ppb	U
127-18-4	Tetrachloroethene	B 733 -1532	2.40	2.40	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-7...continue

Client Sample ID: MW-12 Collected: 04/03/2002 12:20
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 733 -1532	2.00	2.00	ppb	U
591-78-6	2-Hexanone	B 733 -1532	50.0	50.0	ppb	U
124-48-1	Dibromochloromethane	B 733 -1532	1.10	1.10	ppb	U
106-93-4	1,2-Dibromoethane	B 733 -1532	1.00	1.00	ppb	U
108-90-7	Chlorobenzene	B 733 -1532	1.50	1.50	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 733 -1532	1.80	1.80	ppb	U
100-41-4	Ethylbenzene	B 733 -1532	2.20	2.20	ppb	U
108-38-3	m,p-xylene	B 733 -1532	4.20	4.20	ppb	U
95-47-6	o-xylene	B 733 -1532	2.00	2.00	ppb	U
100-42-5	Styrene	B 733 -1532	1.70	1.70	ppb	U
75-25-2	Bromoform	B 733 -1532	1.00	1.00	ppb	U
98-82-8	Isopropylbenzene	B 733 -1532	2.50	2.50	ppb	U
108-86-1	Bromobenzene	B 733 -1532	2.40	2.40	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 733 -1532	1.60	1.60	ppb	U
103-65-1	n-Propylbenzene	B 733 -1532	2.10	2.10	ppb	U
96-18-4	1,2,3-Trichloropropane	B 733 -1532	2.10	2.10	ppb	U
622-96-8	p-Ethyltoluene	B 733 -1532	2.40	2.40	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 733 -1532	2.00	2.00	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1511	13.5	**3660**	ppb	
106-43-4	4-Chlorotoluene	B 733 -1532	3.50	**139**	ppb	
98-06-6	tert-Butylbenzene	B 733 -1532	2.40	2.40	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 733 -1532	1.70	1.70	ppb	U
135-98-8	sec-Butylbenzene	B 733 -1532	1.60	1.60	ppb	U
99-87-6	4-Isopropyltoluene	B 733 -1532	2.40	2.40	ppb	U
541-73-1	1,3-Dichlorobenzene	B 733 -1532	2.30	2.30	ppb	U
106-46-7	1,4-Dichlorobenzene	B 733 -1532	2.30	2.30	ppb	U
95-50-1	1,2-Dichlorobenzene	B 733 -1532	1.50	1.50	ppb	U
105-05-5	p-Diethylbenzene	B 733 -1532	2.40	2.40	ppb	U
104-51-8	n-Butylbenzene	B 733 -1532	1.40	1.40	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 733 -1532	2.60	2.60	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 733 -1532	3.30	3.30	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 733 -1532	2.20	2.20	ppb	U
87-68-3	Hexachlorobutadiene	B 733 -1532	2.60	2.60	ppb	U
91-20-3	Naphthalene	B 733 -1532	1.40	1.40	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 733 -1532	1.70	1.70	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-7...continue

Client Sample ID: MW-12
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Type: Grab

Collected: 04/03/2002 12:20

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1511	99.8 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1511	98.0 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1511	103.0 %	(86- 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1532	102.0 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1532	98.1 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1532	104.0 %	(86- 110)	

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-8

Client Sample ID: MW-13 Collected: 04/03/2002 10:40
Matrix: Liquid Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1512	0.49	0.49	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1512	0.21	0.21	ppb	U
74-87-3	Chloromethane	B 732 -1512	0.49	0.49	ppb	U
75-01-4	Vinyl Chloride	B 732 -1512	0.10	**74.0**	ppb	
74-83-9	Bromomethane	B 732 -1512	0.43	0.43	ppb	U
75-00-3	Chloroethane	B 732 -1512	0.61	0.61	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1512	0.24	0.24	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1512	0.23	0.23	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1512	0.30	**43.6**	ppb	
67-64-1	Acetone	B 732 -1512	3.12	3.12	ppb	U
75-15-0	Carbon disulfide	B 732 -1512	0.20	0.20	ppb	U
75-09-2	Methylene Chloride	B 732 -1512	0.54	0.54	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1512	0.20	**8.00**	ppb	
1634-04-4	Methyl t-butyl ether	B 732 -1512	0.34	0.34	ppb	U
75-34-3	1,1-Dichloroethane	B 733 -1533	2.20	**305**	ppb	
590-20-7	2,2-Dichloropropane	B 732 -1512	0.18	0.18	ppb	U
156-59-2	c-1,2-Dichloroethene	B 733 -1533	2.10	**988**	ppb	
78-93-3	2-Butanone	B 732 -1512	5.00	5.00	ppb	U
74-97-5	Bromochloromethane	B 732 -1512	0.27	0.27	ppb	U
67-66-3	Chloroform	B 732 -1512	0.20	0.20	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1512	0.22	**19.7**	ppb	
56-23-5	Carbon Tetrachloride	B 732 -1512	0.25	0.25	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1512	0.59	0.59	ppb	U
71-43-2	Benzene	B 732 -1512	0.16	**4.70**	ppb	
107-06-2	1,2-Dichloroethane	B 732 -1512	0.23	0.23	ppb	U
79-01-6	Trichloroethene	B 732 -1512	0.16	**132**	ppb	
78-87-5	1,2-Dichloropropane	B 732 -1512	0.36	0.36	ppb	U
74-95-3	Dibromomethane	B 732 -1512	0.18	0.18	ppb	U
75-27-4	Bromodichloromethane	B 732 -1512	0.15	0.15	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1512	0.13	0.13	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1512	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1512	5.00	5.00	ppb	U
108-88-3	Toluene	B 732 -1512	0.14	0.14	ppb	U
10061-02-6	t-1,3-Dichloropropene	B 732 -1512	0.080	0.080	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1512	0.090	0.090	ppb	U
127-18-4	Tetrachloroethene	B 733 -1533	2.40	**227**	ppb	

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Volatiles - EPA 8260B

Sample: L8329-8...continue

Client Sample ID: MW-13 Collected: 04/03/2002 10:40

Matrix: Liquid Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1512	0.20	0.20	ppb	U
591-78-6	2-Hexanone	B 732 -1512	5.00	5.00	ppb	U
124-48-1	Dibromochloromethane	B 732 -1512	0.11	0.11	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1512	0.10	0.10	ppb	U
108-90-7	Chlorobenzene	B 732 -1512	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1512	0.18	0.18	ppb	U
100-41-4	Ethylbenzene	B 732 -1512	0.22	0.22	ppb	U
108-38-3	m,p-xylene	B 732 -1512	0.42	0.42	ppb	U
95-47-6	o-xylene	B 732 -1512	0.20	0.20	ppb	U
100-42-5	Styrene	B 732 -1512	0.17	0.17	ppb	U
75-25-2	Bromoform	B 732 -1512	0.10	0.10	ppb	U
98-82-8	Isopropylbenzene	B 732 -1512	0.25	0.25	ppb	U
108-86-1	Bromobenzene	B 732 -1512	0.24	0.24	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1512	0.16	0.16	ppb	U
103-65-1	n-Propylbenzene	B 732 -1512	0.21	0.21	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1512	0.21	0.21	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1512	0.24	0.24	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1512	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1512	0.27	**27.8**	ppb	
106-43-4	4-Chlorotoluene	B 732 -1512	0.35	0.35	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1512	0.24	0.24	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1512	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1512	0.16	0.16	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1512	0.24	0.24	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1512	0.23	0.23	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1512	0.23	0.23	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1512	0.15	0.15	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1512	0.24	0.24	ppb	U
104-51-8	n-Butylbenzene	B 732 -1512	0.14	0.14	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1512	0.26	0.26	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1512	0.33	0.33	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1512	0.22	0.22	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1512	0.26	0.26	ppb	U
91-20-3	Naphthalene	B 732 -1512	0.14	0.14	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1512	0.17	0.17	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-8...continue

Client Sample ID: MW-13

Collected: 04/03/2002 10:40

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1512	99.5 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1512	97.7 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1512	101.0 %	(86- 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1533	99.4 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1533	98.6 %	(65- 117)	
2037-26-5	TOLUENE-D8	B733-1533	103.0 %	(86- 110)	

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-9

Client Sample ID: MW-3S

Collected: 04/04/2002 11:00

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1513	0.49	0.49	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1513	0.21	0.21	ppb	U
74-87-3	Chloromethane	B 732 -1513	0.49	0.49	ppb	U
75-01-4	Vinyl Chloride	B 732 -1513	0.10	0.10	ppb	U
74-83-9	Bromomethane	B 732 -1513	0.43	0.43	ppb	U
75-00-3	Chloroethane	B 732 -1513	0.61	0.61	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1513	0.24	0.24	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1513	0.23	0.23	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1513	0.30	0.30	ppb	U
67-64-1	Acetone	B 732 -1513	3.12	3.12	ppb	U
75-15-0	Carbon disulfide	B 732 -1513	0.20	0.20	ppb	U
75-09-2	Methylene Chloride	B 732 -1513	0.54	0.54	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1513	0.20	0.20	ppb	U
1634-04-4	Methyl t-butyl ether	B 732 -1513	0.34	0.34	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1513	0.22	0.22	ppb	U
590-20-7	2,2-Dichloropropane	B 732 -1513	0.18	0.18	ppb	U
156-59-2	c-1,2-Dichloroethene	B 732 -1513	0.21	**4.00**	ppb	
78-93-3	2-Butanone	B 732 -1513	5.00	5.00	ppb	U
74-97-5	Bromochloromethane	B 732 -1513	0.27	0.27	ppb	U
67-66-3	Chloroform	B 732 -1513	0.20	0.20	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1513	0.22	0.22	ppb	U
56-23-5	Carbon Tetrachloride	B 732 -1513	0.25	0.25	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1513	0.59	0.59	ppb	U
71-43-2	Benzene	B 732 -1513	0.16	0.16	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1513	0.23	0.23	ppb	U
79-01-6	Trichloroethene	B 732 -1513	0.16	**41.6**	ppb	
78-87-5	1,2-Dichloropropane	B 732 -1513	0.36	0.36	ppb	U
74-95-3	Dibromomethane	B 732 -1513	0.18	0.18	ppb	U
75-27-4	Bromodichloromethane	B 732 -1513	0.15	0.15	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1513	0.13	0.13	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1513	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1513	5.00	5.00	ppb	U
108-88-3	Toluene	B 732 -1513	0.14	0.14	ppb	U
10061-02-6	t-1,3-Dichloropropene	B 732 -1513	0.080	0.080	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1513	0.090	0.090	ppb	U
127-18-4	Tetrachloroethene	B 732 -1513	0.24	**8.50**	ppb	

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Volatiles - EPA 8260B

Sample: L8329-9...continue

Client Sample ID: MW-3S

Collected: 04/04/2002 11:00

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1513	0.20	0.20	ppb	U
591-78-6	2-Hexanone	B 732 -1513	5.00	5.00	ppb	U
124-48-1	Dibromochloromethane	B 732 -1513	0.11	0.11	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1513	0.10	0.10	ppb	U
108-90-7	Chlorobenzene	B 732 -1513	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1513	0.18	0.18	ppb	U
100-41-4	Ethylbenzene	B 732 -1513	0.22	0.22	ppb	U
108-38-3	m,p-xylene	B 732 -1513	0.42	0.42	ppb	U
95-47-6	o-xylene	B 732 -1513	0.20	0.20	ppb	U
100-42-5	Styrene	B 732 -1513	0.17	0.17	ppb	U
75-25-2	Bromoform	B 732 -1513	0.10	0.10	ppb	U
98-82-8	Isopropylbenzene	B 732 -1513	0.25	0.25	ppb	U
108-86-1	Bromobenzene	B 732 -1513	0.24	0.24	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1513	0.16	0.16	ppb	U
103-65-1	n-Propylbenzene	B 732 -1513	0.21	0.21	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1513	0.21	0.21	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1513	0.24	0.24	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1513	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1513	0.27	0.27	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1513	0.35	0.35	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1513	0.24	0.24	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1513	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1513	0.16	0.16	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1513	0.24	0.24	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1513	0.23	0.23	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1513	0.23	0.23	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1513	0.15	0.15	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1513	0.24	0.24	ppb	U
104-51-8	n-Butylbenzene	B 732 -1513	0.14	0.14	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1513	0.26	0.26	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1513	0.33	0.33	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1513	0.22	0.22	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1513	0.26	0.26	ppb	U
91-20-3	Naphthalene	B 732 -1513	0.14	0.14	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1513	0.17	0.17	ppb	U

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Volatiles - EPA 8260B

Sample: L8329-9...continue

Client Sample ID: MW-3S
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Type: Grab

Collected: 04/04/2002 11:00

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1513	99.9 %	(78 - 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1513	98.4 %	(65 - 117)	
2037-26-5	TOLUENE-D8	B732-1513	101.0 %	(86 - 110)	

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Volatiles - EPA 8260B

Sample: L8329-10

Client Sample ID: MW-4S
Collected: 04/04/2002 10:30
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1514	0.49	0.49	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1514	0.21	0.21	ppb	U
74-87-3	Chloromethane	B 732 -1514	0.49	0.49	ppb	U
75-01-4	Vinyl Chloride	B 732 -1514	0.10	0.10	ppb	U
74-83-9	Bromomethane	B 732 -1514	0.43	0.43	ppb	U
75-00-3	Chloroethane	B 732 -1514	0.61	0.61	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1514	0.24	0.24	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1514	0.23	0.23	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1514	0.30	0.30	ppb	U
67-64-1	Acetone	B 732 -1514	3.12	3.12	ppb	U
75-15-0	Carbon disulfide	B 732 -1514	0.20	0.20	ppb	U
75-09-2	Methylene Chloride	B 732 -1514	0.54	0.54	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1514	0.20	0.20	ppb	U
1634-04-4	Methyl t-butyl ether	B 732 -1514	0.34	0.34	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1514	0.22	0.22	ppb	U
590-20-7	2,2-Dichloropropane	B 732 -1514	0.18	0.18	ppb	U
156-59-2	c-1,2-Dichloroethene	B 732 -1514	0.21	**3.80**	ppb	
78-93-3	2-Butanone	B 732 -1514	5.00	5.00	ppb	U
74-97-5	Bromochloromethane	B 732 -1514	0.27	0.27	ppb	U
67-66-3	Chloroform	B 732 -1514	0.20	0.20	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1514	0.22	0.22	ppb	U
56-23-5	Carbon Tetrachloride	B 732 -1514	0.25	0.25	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1514	0.59	0.59	ppb	U
71-43-2	Benzene	B 732 -1514	0.16	0.16	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1514	0.23	0.23	ppb	U
79-01-6	Trichloroethene	B 732 -1514	0.16	**30.3**	ppb	
78-87-5	1,2-Dichloropropane	B 732 -1514	0.36	0.36	ppb	U
74-95-3	Dibromomethane	B 732 -1514	0.18	0.18	ppb	U
75-27-4	Bromodichloromethane	B 732 -1514	0.15	0.15	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1514	0.13	0.13	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1514	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1514	5.00	5.00	ppb	U
108-88-3	Toluene	B 732 -1514	0.14	0.14	ppb	U
10061-02-6	t-1,3-Dichloropropene	B 732 -1514	0.080	0.080	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1514	0.090	0.090	ppb	U
127-18-4	Tetrachloroethene	B 733 -1534	4.80	**1910**	ppb	

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-10...continue

Client Sample ID: MW-4S

Collected: 04/04/2002 10:30

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1514	0.20	0.20	ppb	U
591-78-6	2-Hexanone	B 732 -1514	5.00	5.00	ppb	U
124-48-1	Dibromochloromethane	B 732 -1514	0.11	0.11	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1514	0.10	0.10	ppb	U
108-90-7	Chlorobenzene	B 732 -1514	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1514	0.18	0.18	ppb	U
100-41-4	Ethylbenzene	B 732 -1514	0.22	0.22	ppb	U
108-38-3	m,p-xylene	B 732 -1514	0.42	0.42	ppb	U
95-47-6	o-xylene	B 732 -1514	0.20	0.20	ppb	U
100-42-5	Styrene	B 732 -1514	0.17	0.17	ppb	U
75-25-2	Bromoform	B 732 -1514	0.10	0.10	ppb	U
98-82-8	Isopropylbenzene	B 732 -1514	0.25	0.25	ppb	U
108-86-1	Bromobenzene	B 732 -1514	0.24	0.24	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1514	0.16	0.16	ppb	U
103-65-1	n-Propylbenzene	B 732 -1514	0.21	0.21	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1514	0.21	0.21	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1514	0.24	0.24	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1514	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1514	0.27	0.27	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1514	0.35	0.35	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1514	0.24	0.24	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1514	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1514	0.16	0.16	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1514	0.24	0.24	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1514	0.23	0.23	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1514	0.23	0.23	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1514	0.15	0.15	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1514	0.24	0.24	ppb	U
104-51-8	n-Butylbenzene	B 732 -1514	0.14	0.14	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1514	0.26	0.26	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1514	0.33	0.33	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1514	0.22	0.22	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1514	0.26	0.26	ppb	U
91-20-3	Naphthalene	B 732 -1514	0.14	0.14	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1514	0.17	0.17	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-10...continue

Client Sample ID: MW-4S
Matrix: Liquid
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Type: Grab

Collected: 04/04/2002 10:30

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1514	99.9 %	(78 - 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1514	97.6 %	(65 - 117)	
2037-26-5	TOLUENE-D8	B732-1514	103.0 %	(86 - 110)	
460-00-4	4-BROMOFLUOROBENZENE	B733-1534	100.0 %	(78 - 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B733-1534	98.0 %	(65 - 117)	
2037-26-5	TOLUENE-D8	B733-1534	102.0 %	(86 - 110)	

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-11

Client Sample ID: Trip Blank
Collected: 04/02/2002
Matrix: Liquid
Type: Grab
Remarks: See Case Narrative
Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
75-71-8	Dichlorodifluoromethane	B 732 -1501	0.49	0.49	ppb	U
75-45-6	Chlorodifluoromethane	B 732 -1501	0.21	0.21	ppb	U
74-87-3	Chloromethane	B 732 -1501	0.49	0.49	ppb	U
75-01-4	Vinyl Chloride	B 732 -1501	0.10	0.10	ppb	U
74-83-9	Bromomethane	B 732 -1501	0.43	0.43	ppb	U
75-00-3	Chloroethane	B 732 -1501	0.61	0.61	ppb	U
75-69-4	Trichlorofluoromethane	B 732 -1501	0.24	0.24	ppb	U
76-13-1	1,1,2-Trichlorotrifluoroethane	B 732 -1501	0.23	0.23	ppb	U
75-35-4	1,1-Dichloroethene	B 732 -1501	0.30	0.30	ppb	U
67-64-1	Acetone	B 732 -1501	3.12	3.12	ppb	U
75-15-0	Carbon disulfide	B 732 -1501	0.20	0.20	ppb	U
75-09-2	Methylene Chloride	B 732 -1501	0.54	0.54	ppb	U
156-60-5	t-1,2-Dichloroethene	B 732 -1501	0.20	0.20	ppb	U
1634-04-4	Methyl t-butyl ether	B 732 -1501	0.34	0.34	ppb	U
75-34-3	1,1-Dichloroethane	B 732 -1501	0.22	0.22	ppb	U
590-20-7	2,2-Dichloropropane	B 732 -1501	0.18	0.18	ppb	U
156-59-2	c-1,2-Dichloroethene	B 732 -1501	0.21	0.21	ppb	U
78-93-3	2-Butanone	B 732 -1501	5.00	5.00	ppb	U
74-97-5	Bromochloromethane	B 732 -1501	0.27	0.27	ppb	U
67-66-3	Chloroform	B 732 -1501	0.20	0.20	ppb	U
71-55-6	1,1,1-Trichloroethane	B 732 -1501	0.22	0.22	ppb	U
56-23-5	Carbon Tetrachloride	B 732 -1501	0.25	0.25	ppb	U
563-58-6	1,1-Dichloropropene	B 732 -1501	0.59	0.59	ppb	U
71-43-2	Benzene	B 732 -1501	0.16	0.16	ppb	U
107-06-2	1,2-Dichloroethane	B 732 -1501	0.23	0.23	ppb	U
79-01-6	Trichloroethene	B 732 -1501	0.16	0.16	ppb	U
78-87-5	1,2-Dichloropropane	B 732 -1501	0.36	0.36	ppb	U
74-95-3	Dibromomethane	B 732 -1501	0.18	0.18	ppb	U
75-27-4	Bromodichloromethane	B 732 -1501	0.15	0.15	ppb	U
110-75-8	2-Chloroethylvinylether	B 732 -1501	0.13	0.13	ppb	U
10061-01-5	c-1,3-Dichloropropene	B 732 -1501	0.16	0.16	ppb	U
108-10-1	4-Methyl-2-pentanone	B 732 -1501	5.00	5.00	ppb	U
108-88-3	Toluene	B 732 -1501	0.14	0.14	ppb	U
10061-02-6	t-1,3-Dichloropropene	B 732 -1501	0.080	0.080	ppb	U
79-00-5	1,1,2-Trichloroethane	B 732 -1501	0.090	0.090	ppb	U
127-18-4	Tetrachloroethene	B 732 -1501	0.24	0.24	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-11...continue

Client Sample ID: Trip Blank — Collected: 04/02/2002

Matrix: Liquid — Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Analyte	File ID	MDL	Concentration	Units	Q
142-28-9	1,3-Dichloropropane	B 732 -1501	0.20	0.20	ppb	U
591-78-6	2-Hexanone	B 732 -1501	5.00	5.00	ppb	U
124-48-1	Dibromochloromethane	B 732 -1501	0.11	0.11	ppb	U
106-93-4	1,2-Dibromoethane	B 732 -1501	0.10	0.10	ppb	U
108-90-7	Chlorobenzene	B 732 -1501	0.15	0.15	ppb	U
630-20-6	1,1,1,2-Tetrachloroethane	B 732 -1501	0.18	0.18	ppb	U
100-41-4	Ethylbenzene	B 732 -1501	0.22	0.22	ppb	U
108-38-3	m,p-xylene	B 732 -1501	0.42	0.42	ppb	U
95-47-6	o-xylene	B 732 -1501	0.20	0.20	ppb	U
100-42-5	Styrene	B 732 -1501	0.17	0.17	ppb	U
75-25-2	Bromoform	B 732 -1501	0.10	0.10	ppb	U
98-82-8	Isopropylbenzene	B 732 -1501	0.25	0.25	ppb	U
108-86-1	Bromobenzene	B 732 -1501	0.24	0.24	ppb	U
79-34-5	1,1,2,2-Tetrachloroethane	B 732 -1501	0.16	0.16	ppb	U
103-65-1	n-Propylbenzene	B 732 -1501	0.21	0.21	ppb	U
96-18-4	1,2,3-Trichloropropane	B 732 -1501	0.21	0.21	ppb	U
622-96-8	p-Ethyltoluene	B 732 -1501	0.24	0.24	ppb	U
108-67-8	1,3,5-Trimethylbenzene	B 732 -1501	0.20	0.20	ppb	U
95-49-8	2-Chlorotoluene	B 732 -1501	0.27	0.27	ppb	U
106-43-4	4-Chlorotoluene	B 732 -1501	0.35	0.35	ppb	U
98-06-6	tert-Butylbenzene	B 732 -1501	0.24	0.24	ppb	U
95-63-6	1,2,4-Trimethylbenzene	B 732 -1501	0.17	0.17	ppb	U
135-98-8	sec-Butylbenzene	B 732 -1501	0.16	0.16	ppb	U
99-87-6	4-Isopropyltoluene	B 732 -1501	0.24	0.24	ppb	U
541-73-1	1,3-Dichlorobenzene	B 732 -1501	0.23	0.23	ppb	U
106-46-7	1,4-Dichlorobenzene	B 732 -1501	0.23	0.23	ppb	U
95-50-1	1,2-Dichlorobenzene	B 732 -1501	0.15	0.15	ppb	U
105-05-5	p-Diethylbenzene	B 732 -1501	0.24	0.24	ppb	U
104-51-8	n-Butylbenzene	B 732 -1501	0.14	0.14	ppb	U
95-93-2	1,2,4,5-Tetramethylbenzene	B 732 -1501	0.26	0.26	ppb	U
96-12-8	1,2-Dibromo-3-chloropropane	B 732 -1501	0.33	0.33	ppb	U
120-82-1	1,2,4-Trichlorobenzene	B 732 -1501	0.22	0.22	ppb	U
87-68-3	Hexachlorobutadiene	B 732 -1501	0.26	0.26	ppb	U
91-20-3	Naphthalene	B 732 -1501	0.14	0.14	ppb	U
87-61-6	1,2,3-Trichlorobenzene	B 732 -1501	0.17	0.17	ppb	U

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04/16/2002

Volatiles - EPA 8260B

Sample: L8329-11...continue

Client Sample ID: Trip Blank

Collected: 04/02/2002

Matrix: Liquid

Type: Grab

Remarks: See Case Narrative

Analyzed Date: 04/05/2002

Cas No	Surrogate	File ID	% Recovery	QC Limits	Q
460-00-4	4-BROMOFLUOROBENZENE	B732-1501	99.4 %	(78- 112)	
4774-33-8	DIBROMOFLUOROMETHANE	B732-1501	94.3 %	(65- 117)	
2037-26-5	TOLUENE-D8	B732-1501	102.0 %	(86- 110)	

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04/16/2002

Iron, Total

Sample: L8329-1

Client Sample ID: SMP-1 Collected: 04/02/2002 15:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**18.3**	ppm	

Sample: L8329-2

Client Sample ID: DMP-1 Collected: 04/02/2002 14:40

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**4.11**	ppm	

Sample: L8329-3

Client Sample ID: SMP-3 Collected: 04/02/2002 13:50

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**8.46**	ppm	

Sample: L8329-4

Client Sample ID: DMP-3 Collected: 04/02/2002 13:20

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**35.8**	ppm	

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04/16/2002

Iron, Total

Sample: L8329-5

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**29.1**	ppm	

Sample: L8329-6

Client Sample ID: MW-8 Collected: 04/03/2002 13:35

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	0.096	ppm	U

Sample: L8329-7

Client Sample ID: MW-12 Collected: 04/03/2002 12:20

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.96	**934**	ppm	

Sample: L8329-8

Client Sample ID: MW-13 Collected: 04/03/2002 10:40

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/08/2002

Cas No	Analyte	MDL	Concentration	Units	Q
7439-89-6	Iron	0.096	**0.76**	ppm	

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04/16/2002

Nitrogen/Nitrate - EPA 353.2

Sample: L8329-1
Client Sample ID: SMP-1 Collected: 04/02/2002 15:10
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.046**	ppm	

Sample: L8329-2
Client Sample ID: DMP-1 Collected: 04/02/2002 14:40
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	0.025	ppm	U

Sample: L8329-3
Client Sample ID: SMP-3 Collected: 04/02/2002 13:50
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.0090**	ppm	J

Sample: L8329-4
Client Sample ID: DMP-3 Collected: 04/02/2002 13:20
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.029**	ppm	

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04/16/2002

Nitrogen/Nitrate - EPA 353.2

Sample: L8329-5

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.051**	ppm	

Sample: L8329-6

Client Sample ID: MW-8 Collected: 04/03/2002 13:35

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**6.66**	ppm	

Sample: L8329-7

Client Sample ID: MW-12 Collected: 04/03/2002 12:20

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**0.099**	ppm	

Sample: L8329-8

Client Sample ID: MW-13 Collected: 04/03/2002 10:40

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/04/2002

Cas No	Analyte	MDL	Result	Units	Q
14797-55-8	Nitrate	0.025	**4.84**	ppm	

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04/16/2002

Sulfate - EPA 375.4

Sample: L8329-1

Client Sample ID: SMP-1 Collected: 04/02/2002 15:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.78	**513**	ppm	

Sample: L8329-2

Client Sample ID: DMP-1 Collected: 04/02/2002 14:40

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.78	**2070**	ppm	

Sample: L8329-3

Client Sample ID: SMP-3 Collected: 04/02/2002 13:50

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	1.56	**3640**	ppm	

Sample: L8329-4

Client Sample ID: DMP-3 Collected: 04/02/2002 13:20

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.78	**127**	ppm	

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04/16/2002

Sulfate - EPA 375.4

Sample: L8329-5
Client Sample ID: DMP-4 Collected: 04/02/2002 14:10
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.78	**176**	ppm	

Sample: L8329-6
Client Sample ID: MW-8 Collected: 04/03/2002 13:35
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.078	**23.2**	ppm	

Sample: L8329-7
Client Sample ID: MW-12 Collected: 04/03/2002 12:20
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.78	**1160**	ppm	

Sample: L8329-8
Client Sample ID: MW-13 Collected: 04/03/2002 10:40
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/09/2002

Cas No	Analyte	MDL	Result	Units	Q
14808-79-8	Sulfate	0.16	**366**	ppm	

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04/16/2002

Total Organic Carbon - Method 415.1

Sample: L8329-1
Client Sample ID: SMP-1 Collected: 04/02/2002 15:10
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**63.1**	ppm	

Sample: L8329-2
Client Sample ID: DMP-1 Collected: 04/02/2002 14:40
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**41.1**	ppm	

Sample: L8329-3
Client Sample ID: SMP-3 Collected: 04/02/2002 13:50
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**1600**	ppm	

Sample: L8329-4
Client Sample ID: DMP-3 Collected: 04/02/2002 13:20
Matrix: Liquid Type: Grab
Remarks:
Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**102**	ppm	

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04/16/2002

Total Organic Carbon - Method 415.1

Sample: L8329-5

Client Sample ID: DMP-4 Collected: 04/02/2002 14:10

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**71.7**	ppm	

Sample: L8329-6

Client Sample ID: MW-8 Collected: 04/03/2002 13:35

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**1.41**	ppm	

Sample: L8329-7

Client Sample ID: MW-12 Collected: 04/03/2002 12:20

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**72.6**	ppm	

Sample: L8329-8

Client Sample ID: MW-13 Collected: 04/03/2002 10:40

Matrix: Liquid Type: Grab

Remarks:

Analyzed Date: 04/15/2002

Cas No	Analyte	MDL	Result	Units	Q
	TOC	0.51	**15.4**	ppm	

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04/16/2002

Case Narrative

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The following compounds were calibrated at 25, 50, 100, 150 and 200 ppb levels in the initial calibration curve:

Acetone
2-Butanone
4-Methyl,2-pentanone
2-Hexanone

M&P-Xylenes were calibrated at 10, 40, 100, 200 and 300 ppb levels.

All other compounds were calibrated at 5, 20, 50, 100 and 150 ppb levels.

Reviewed by: _____

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04/16/2002

ORGANIC METHOD QUALIFIERS

Q - Qualifier - specified entries and their meanings are as follows:

U - The analytical result is a non-detect.

J - Indicates an estimated value. The concentration reported was detected below the Method Detection Limit.

B - The analyte was found in the associated method blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

E - The concentration of the analyte exceeded the calibration range of the instrument.

D - This flag identifies all compounds identified in an analysis at a secondary dilution. In the case of a surrogate this flag indicates a system mointoring compound diluted out.

INORGANIC METHOD QUALIFIERS

C - (Concentration) qualifiers are as follows:

B - Entered if the reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

U - Entered when the analyte was analyzed for, but not detected.

Q - Qualifier specific entries and their meanings are as follows:

E - Reported value is estimated because of the presence of interferences.

M - (Method) qualifiers are as follows:

A - Flame AA

AS - Semi-automated Spectrophotometric

AV - Automated Cold Vapor AA

C - Manual Spectrophotometric

F - Furnace AA

P - ICP

T - Titrimetric

OTHER QUALIFIERS

ND - Not Detected

NA - Not Applicable

NR - Not Required

* - Outside Expected Range (NYCDEP Table I/II or Surrogate Limits)

OTHER

- All soil and sediment samples are reported on a dry weight basis.

ETL

Environmental Testing Laboratories, Inc.
208 Route 109 • Farmingdale • New York 11735
631-249-1456 • Fax: 631-249-8344

CHAIN OF CUSTODY DOCUMENT

Results to: Charle Nehrig
PhotoCircuits
3154575200

L 8329

Project Name: PhotoCircuits | Project Manager: Andy Barber | Sampler (Signature): David Hanny (Print): DAVE HANNY

Project Address: 31 SeaCliff Ave. Glen Cove NY

Client PhotoCircuits J/N: | ☐ Rush by / /

SAMPLE INFO Type: SS = Split Spoon; G = Grab; C = Composite; B = Blank; Matrix: L = Liquid; S = Soil; SL = Sludge; A* = Air; W = Wipe | *Air - Vol. (Liters) include: Flow (CFM)

ID	Date	Time	Type	Matrix	Sample Location	Total. # Cont.	601/602	BTX/BTEX	MTBE	624/8260/8021	625/8270/BN	PCB/Pesticides	Pet.Prods./8100M	RCRA Metals	pH/Flash/React	418.1 - TRPH	TOC	Nitrate/Sulfate	Iron	8260 B
1	4/2/02	15:10	G	L	SMP 1	5										X	X	X	X	
2	4/2/02	14:40	G	L	DMP 1	5										X	X	X	X	
3	4/2/02	13:50	G	L	SMP 3	5										X	X	X	X	
4	4/2/02	13:20	G	L	DMP 3	5										X	X	X	X	
5	4/2/02	14:10	G	L	DMP 4	5										X	X	X	X	
6	4/3/02	13:35	G	L	MW 8	5										X	X	X	X	
7	4/3/02	12:20	G	L	MW 12	5										X	X	X	X	
8	4/3/02	10:40	G	L	MW 13	5										X	X	X	X	
9	4/4/02	1100	G	L	MW 3S	32													X	
10	4/4/02	1030	G	L	MW 4S	2													X	
11	4/1/02			L	Trip Blank	2													X	
12																				
13																				
14																				
15																				

Relinquished by (Signature):	Date / Time	Printed Name & Agent:	Received by (Signature):	Date / Time	Printed Name & Agent
David Hanny	4/4/02 1317	David Hanny Barton & Loguidice			
Relinquished by (Signature):	Date / Time	Printed Name & Agent:	Received for Lab by (Signature):	Date 4/4/02 Time 3:17	Printed Name GLENN WEXLER
Comments & Special Instructions		QA/QC Type:	Number & Type of Containers: 30-VOA's	Preservatives: HCl (2-VOA's)	Temp: 4°C